

Ceramics, Cuisine *and* Culture

Edited by Michela Spataro and Alexandra Villing



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CERAMICS, CUISINE AND CULTURE: THE ARCHAEOLOGY AND SCIENCE OF KITCHEN POTTERY IN THE ANCIENT MEDITERRANEAN WORLD

edited by

Michela Spataro and Alexandra Villing



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Front cover: above, *J. Morrison producing LM I cooking pot replicas using a potting technique called "coil and wheel fashioning", photograph S. Johnson; below, cooking and stew pots (chytrai and lopades) from Classical Greece (from left, British Museum GR 1864,1007.1937, GR 1964,1007.336, GR 1864,1007.1802, GR 1999,0928.1), photograph © The Trustees of the British Museum.*

Back cover: from top, *micrograph of a thin section of an Archaic cooking pot from Miletos (German excavation inv. Z92.132.4), photograph M. Spataro; Classical Greek terracotta figure of a monkey with mortar and pestle (Tübingen, Museum Schloß Hohentübingen/Antikensammlung, inv. 5703), photograph © Museum Schloß Hohentübingen/Antikensammlung; Early Archaic Aeginetan chytra from Aegina-Kolonna, photograph G. Klebinder-Gauss; terracotta figurine, cook blowing onto embers below a cooking pot on three supports, Phoenician (?), 7th-6th century BC (Paris, Musée du Louvre AO 29576), photograph © RMN Grand Palais (Musée du Louvre)/Franck Raux.*

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PREFACE

This volume developed from the wide-ranging presentations and discussion during and after the conference “Ceramics, cuisine and culture: the archaeology and science of kitchen pottery in the ancient Mediterranean world”, held at the British Museum in December 2010 and organised jointly between the Museum’s Departments of Greece and Rome and Conservation and Scientific Research, in collaboration with the Leverhulme Trust funded ‘Tracing Networks’ Research Programme (Universities of Leicester, Exeter and Glasgow).

The idea of making this theme the topic of a conference germinated within a British Museum research project on ceramic grinding bowls from the eastern Mediterranean led by the two editors. It was in many ways a logical development of the close collaboration between archaeologists and scientists at the Museum, which highlighted the enormous potential of such interdisciplinary work. Most of all, however, it seemed timely. We realised that while the subject was only just beginning to attract attention in scholarship on the first millennium Aegean, elsewhere researchers were actively developing new approaches and investigating different types of kitchen pottery, notably from prehistoric and protohistoric assemblages in the European, Near Eastern and Mediterranean worlds. Coincidentally, food and cuisine was just beginning to crystallise as a key theme within the British Museum’s research programme for the next years.

The aims of the conference were to stimulate an interdisciplinary exchange of ideas and approaches to the study of kitchen pottery between archaeologists, material scientists, historians and ethnoarchaeologists and to set this vital but long-neglected category of evidence in its

wider social, political and economic contexts, so as to exploit it more effectively for understanding ancient societies. Out of this discourse the current volume arose, containing a cross-section of the ideas, approaches and research that were put to discussion in 2010, embedded in their wider epistemological framework by an introductory chapter, and rounded off by concluding reflections on a changing Aegean in the modern era. Rather than mere transcripts of original presentations, the chapters of this volume are the outcome of research transformed and informed by discussions and interactions which began at the conference. The topics they present were deliberately chosen for being more than just isolated case studies; they illustrate the range of approaches at our disposal today, often involving a collaboration between archaeology and science so as to address questions more in-depth.

We tried to structure the different topics discussed during the conference by grouping them under three main headings (see table of contents); of course, this is just one of a range of conceivable arrangements, as the topics are tightly interconnected and fluid, and as the *batterie de cuisine* reflects such a wide variety of interlinked aspects of ancient societies, from vernacular traditions, staple foods, and special *haute cuisine* dishes, to dynamics of change, new culinary identities, acculturation, colonialism, and trade. The individual chapters aim to capture this richness and harness the material’s heuristic potential. A range of social, economic and technological models are discussed on the basis of insights gained from the study of kitchen pottery production, use and evolution. Much discussion and work in the last decade has focussed on technical and social aspects of coarse ware and in particular kitchen

ware. The chapters in this volume contribute to this debate, moving kitchen pottery beyond the Binfordian ‘technomic’ category and embracing a wider view, linking processualism, ceramic-ecology, behavioural schools, and ethnoarchaeology to research on historical developments and cultural transformations covering a broad geographical area of the Mediterranean region and spanning a long chronological sequence.

The conference would not have been possible without the active support of the Keepers of our respective departments at the British Museum, Lesley Fitton in the Department of Greece and Rome, and David Saunders in the Department of Conservation and Scientific Research, as well as the collaboration of Lin Foxhall and her staff at the ‘Tracing Networks’ Research Programme at the University of Leicester. We gratefully acknowledge the financial assistance of the Institute of Classical Studies, London in the conference organisation and of the British Museum’s Scholarly Publications Fund in the volume’s production. Invaluable support was rendered by Catherine Higgitt, Trevor Coughlan, Nigel Meeks and numerous others both within the British Museum and beyond, who generously gave their time and skills to ensure the success and smooth running of the conference. Many colleagues

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Abbreviations of ancient authors follow *The Oxford Classical Dictionary* (ed. S. Hornblower, A. Spawforth and E. Eidinow, 4th edn Oxford, Oxford University Press, 2012).

London, April 2015
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INVESTIGATING CERAMICS, CUISINE AND CULTURE – PAST, PRESENT AND FUTURE

Alexandra Villing and Michela Spataro

“When I wish to mention a ‘cooking pot’ [*chytra*] to you, shall I say ‘cooking pot’?

Or: hollow-bodied jar formed by the whirling potter’s wheel, moulded of earth, baked in another chamber sprung from mother earth, and pregnant with the succulent stewed forms of a milk-nursed, newborn flock?”

(Antiphanes, *Aphrodisios* fr. 55 PCG, *apud* Athenaios 449b)

1. Food, foodways and pottery: setting the scene

Food is fundamental to human existence. Much effort and ingenuity goes into its procurement and preparation; access to it and its consumption are central factors in socio-economic relations; and foodways (a group’s traditional food habits, encompassing feeling, thinking and behaviour towards food) and cuisine (the art of cooking) are deeply linked to social and cultural identity. The introduction of cooking – or rather food processing, often involving heat – was a major step in human evolution in both biological and social terms. Tools such as cooking pots, which enabled boiling to make plants foods digestible and maximise nutritional value, played a key role in this. Cooking practices and food processing technology are central to the social matrix of life.

Food, foodways, cuisine and commensality are rightly beginning to occupy an important space in scholarly research¹ – as are the utensils they require, notably cooking pots and other utilitarian vessels, often ceramic, related to food production, storage, preparation and consumption.

Utilitarian ceramics balance the picture gained from a more traditional focus on high-value, high-visibility or more “artistic” elite goods and monuments. Even the humblest cooking pot, grinding bowl or storage jar can be a vital piece of socio-historical evidence: a decorated storage jar may tell of the value accorded to certain foods, its presence or absence indicating differentiated access to food and social hierarchies; the scorch marks on a cooking pot or the remains of cooking installations can be tell-tale marks of cultural identity or level of economic wealth; a proliferation of cooking and serving implements may attest social stratification and the development of an “haute cuisine”; a new shape of cooking pot may speak of cross-cultural contact or migration and concomitant social change; shapes and fabric choices tell us of craft specialisation and of the technical, cultural and symbolic practices that shape a society’s craft production.

The present volume aims to capture the richness of research into the topic of ceramics, cuisine and culture by presenting the latest research across different disciplines, regions and periods. Covering over three millennia of Mediterranean history, from the Bronze Age through to the Roman period and up the modern day, its contributions range widely, from Portugal to the Balearic Islands, France, Italy, the Aegean islands and mainland Greece, Cyprus and the southern Levant (Fig. 1.1). Yet they all share a common aim: to tease out what kitchen wares can reveal about past and present societies and their development, by utilising, combining and pushing the boundaries of the diverse investigative tools available today: from typological, functional and contextual studies and the evaluation of written sources, to scientific analyses, archaeobotany

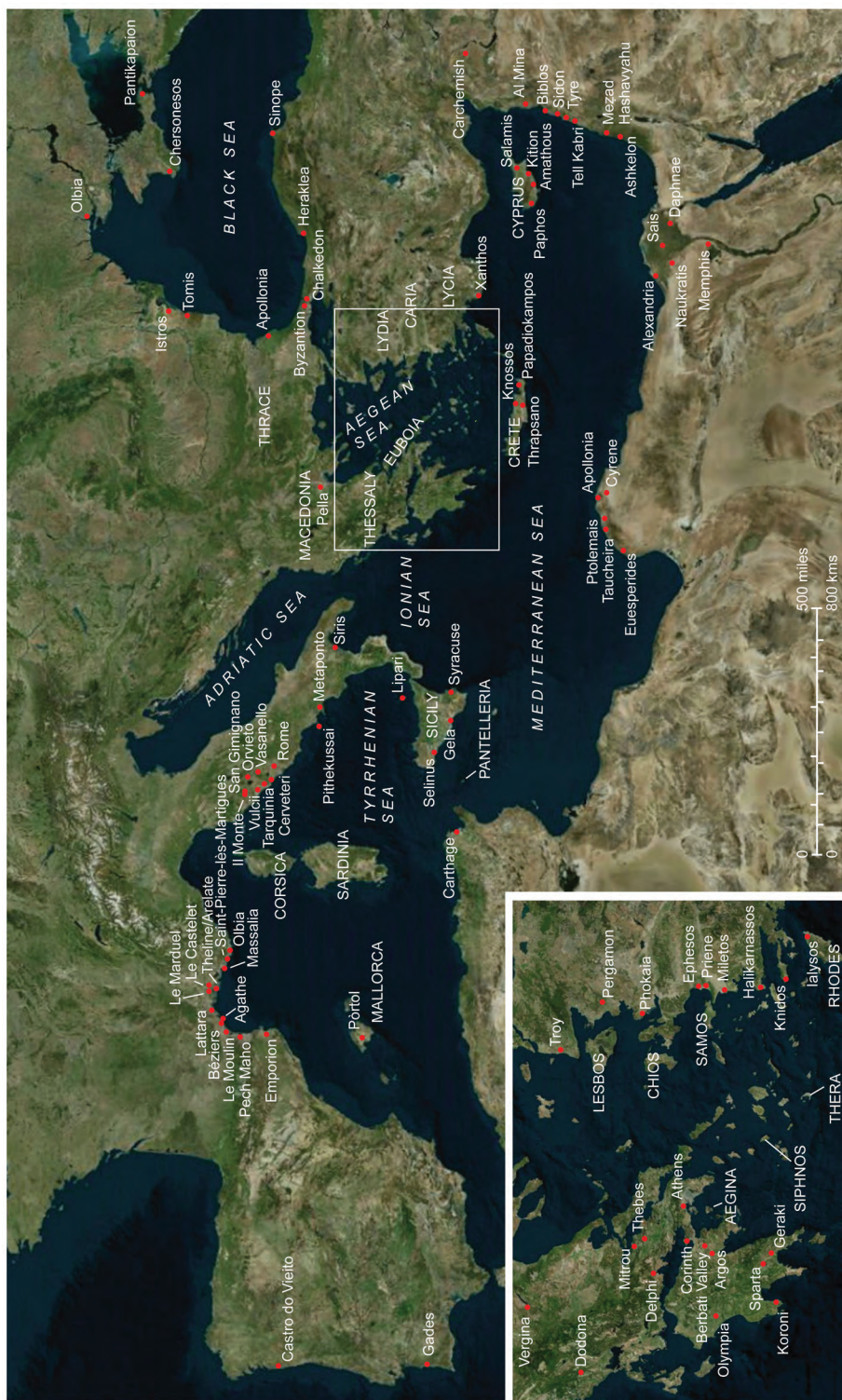


Figure 1.1. The Mediterranean Sea, main regions and sites discussed in the present volume. Drawing Kate Morton, © The Trustees of the British Museum.



Figure 1.2. Cooking pots made from pottery are ubiquitous in many world cultures, often with similar functional characteristics in culturally specific rendering: tripod cooking pots, left, from China, with decorative features based on metal prototypes, 2800–2000 BC (Harvard, Arthur M. Sackler Museum 2006.170.106, photograph © Harvard Art Museums, Arthur M. Sackler Museum); centre, from Cyprus, tripod cooking amphora, 1900–1800 BC (British Museum 1884,1210.63, photograph © The Trustees of the British Museum); right, from Nigeria, late 20th century AD (British Museum AOA 2011,2052.40, photograph © The Trustees of the British Museum).



Figure 1.3. Blowing onto the embers: cooking pots placed above the fire on three supports were common in the first millennium BC Mediterranean world. Phoenician (?) terracotta figurine, 7th–6th century BC (Paris, Musée du Louvre AO 29576. Photo © RMN Grand Palais (Musée du Louvre)/Franck Raux).

and archaeozoology, and experimental and ethnographic archaeology. Where the book differs from other publications is the conscious effort made to integrate the results of scientific analyses with more “traditional” sources of evidence, such as textual studies, to foster a lasting dialogue and collaboration across disciplinary boundaries particularly in scholarship on early historical periods.²



Figure 1.4. Elaborate sauces prepared in pottery grinding bowls (mortaria) became emblematic for the conspicuous consumption of luxury foods that was critically debated in Classical Greece: a series of 5th–4th century BC terracotta figurines parodies the practice by showing monkeys with mortars and pestles (Tübingen, Museum Schloß Hohentübingen/Antikensammlung, inv. 5703. Photograph Museum).

Our approach ultimately takes its inspiration from the New (processualist) Archaeology, which criticised traditional archaeology as mere data collection (e.g. Binford 1983), and called for a more reflexive attitude

(“self-awarenessof what we are doing” [Snodgrass 1985, 34]). Quantitative methods, middle-range theory (the link between human behaviour and artefacts) and cognitive archaeology – bridging the gap between archaeology and anthropology (see Renfrew 1980) – were influential particularly in prehistoric archaeology. Prehistorians had, of course, long paid attention to coarse pottery artefacts as type-fossils and chronological markers in archaeological assemblages (e.g. Petrie 1891; Gillam 1957; Fulford 1975). In contrast to Shepard (1976), who focussed mainly on context and physical properties, from the 1980s attention increasingly turned to pottery function and use, which previously had been little considered (Rice 1990, 1). Binford’s category of “technomic” “artifacts [that] have their primary functional context in coping with the physical environment, and [for which] variability is explainable in ecological terms” (Rice 1990, 3) became widely used to interpret cooking vessels. In combination with increasingly social perspectives, notably the interest in “coarse” utilitarian ceramics as reflections of activities that are essential daily aspects of society such as preparing, cooking, sharing and consuming food (e.g. Schiffer 1990), cooking vessels developed into valuable tools of investigation.

Scholarship of the ancient world has been affected by these developments to varying degrees. Aegean Bronze Age archaeology welcomed processualist ideas, in particular the emphasis on processes rather than events (Snodgrass 1985, 37), alongside new sociological approaches (e.g. Mee and Renard 2007; Karageorghis and Kouka 2011), as did scholarship on contact zones of the Mediterranean world (e.g. Dietler 2010), where textual records are more elusive. Within Classical archaeology, the richness of the archaeological record offered great opportunities for processual interpretation (Dyson 1981; Snodgrass 1985). Yet with a plethora of textual records and a traditional art historical emphasis, the application of new approaches and methods, including also scientific research, remained limited. In pottery studies, typological and iconographic analysis of fine wares still prevail and kitchen pottery or cooking installations remain marginalised.³ However, utilitarian ceramic wares⁴ can be unique tools for investigating social, economic and political aspects of the past also (and particularly) in “historical” periods, where they offer valuable additional evidence for a deeper understanding of complex social and cultural processes behind fast-paced political and historical change. Ubiquitous in the archaeological record and bound into social competition in different ways from table wares, the more publicly visible tools of conspicuous consumption, their direct link to food preparation means that they allow for a socially and temporally broader and more inclusive picture than many other, rarer and more high-

profile objects. They can provide insights into key areas of behaviour related to cultural and social identity and illuminate topics as diverse as social identities, networks and hierarchies, economic and ecological developments, trade, migration and cultural change, craft specialisation, knowledge-exchange and technical innovation (cf. e.g. Rodríguez-Alegría and Graff 2012).

Indeed, as the chapters in the present volume illustrate, new research, particularly with the help of scientific techniques, shows that we have long been misled by the humble appearance of “coarse wares”: “plain” does not necessarily equal simple. Manufacture of utilitarian vessels was often sophisticated, involving diverse processes of technical and social choices, and vessels could have complex life cycles and travel considerable distances. Potters may have devised special fabrics for a pot’s intended function, or continued to use fabrics of traditional cultural or symbolic significance. Traders carried specialised kitchen wares to far-flung places, along complex networks of trade and contact, to consumers attracted by a ware’s quality, actual or reputational.

Pottery was the favoured material for many ancient kitchen vessels (Fig. 1.2), even if other materials that are less commonly preserved in the archaeological record, such as wood or metal, certainly also played a role (such as in Frankish practice: see Donnelly this volume). This was not only because of pottery’s relative cheapness and accessibility, but also because of the intrinsic properties of clay vessels, such as low maintenance requirements and special suitability for certain types of cooking and storing food (Ionas 2000, 124; cf. also Skibo 1992, 28–29), which were clearly recognised already in antiquity. Hence Galen in his *On the Properties of Foodstuffs* (489–490) notes that bread is best baked in an oven, *klibanos* (*clibanus*), made of clay, where it is baked right through,⁵ while Anthimus (see Donnelly this volume) specifically recommends ceramic pots for making stews.⁶ Porous clay water jars to this day are popular for keeping water cool (Kyriakopoulos this volume). In fact, pottery played a role in all stages of alimentation: from food production (e.g. beehives,⁷ dormice jars – see Meulemans this volume) and storage (e.g. *pithoi*, water storage jars, amphorae for wine, oil and many other things) to the preparation (cooking, frying, parching...) and consumption of meals (cups, bowls, platters...)⁸ New research that utilises and integrates different approaches – scientific, archaeological, anthropological, sociological, historical – begins to provide a considered, if complex, picture of the role of household pottery within social, economic, cultural and technological praxis and exchange, and in relation to wider contexts such as environmental conditions and subsistence practices.⁹

In this first chapter we aim to set the scene for what follows – introducing some of the key ideas and methods

that have been, are, or could be applied to the study of cooking ware and culinary practice, with particular reference to the ancient Mediterranean world, and to the chapters assembled in this volume.

2. What is a cooking pot?

When ceramics first appear in Neolithic Europe, it is difficult to identify a “cooking pot” as such. No relationship between shape, fabric and function has yet been traced (*e.g.* Spataro 2006; Tsirtsoni and Yiouni 2002; Vieugué *et al.* 2008). Cooking ware from the Neolithic onwards has always been equated with so-called coarse ware, in contrast to finer, often painted or slipped ware, but the use of coarse ware and early slipped monochrome or painted pots has rarely been studied in detail. However, recent investigations of charred food crusts on a small number of pots attributed to the Late Mesolithic Ertebølle and Neolithic Funnel Beaker cultures at the coastal site of Neustadt (Germany) have yielded evidence not only for meat fat and fish, but also for spice, early indications for a relatively sophisticated cuisine (Saul *et al.* 2013). It is likely that most prehistoric vessels were multi-functional, but not all: the Linearbandkeramik “cheese strainers” found in Poland are an interesting case, because the form of the pot suggested a function (based on ethnographic analogies), which was then confirmed by residue analysis with gas chromatography-mass spectrometry (Salque *et al.* 2012).

By the Bronze Age, in Europe and notably the Mediterranean area, the shape repertoire is more varied and includes special, often elaborate drinking and dining pottery as well as (frequently less decorated, but sometimes equally elaborate) utilitarian vessels for food storage, transport and preparation, indicative of conspicuous consumption and new foods and drinks that required special vessels for their preparation. Such pots, which clearly had a social dimension, as well as the emergence of the kitchen as separate space in certain contexts, have implications for the division of labour and social stratification and suggest the emergence of elites and domestic servants, as well as increasing craft specialisation. They are connected to the development of what may be termed “cuisine”, and in particular a socially differentiated cuisine (Goody 1982), involving a greater choice of foods.

Changes in cooking pot shapes and sizes and in cooking installations, indicate changes in culinary practice particularly from the Late Bronze Age onwards. These are explored in detail by a number of chapters in this volume: shifts such as from the tripod cooking pot and cooking jug to the differently-shaped *chytra* and *lopas* (Rotroff this volume; Boileau and Whitley this volume; Lis this volume) in the Greek world and eventually to Roman shapes such

as the *patina* or *patella* (Schörner this volume; Quercia this volume).¹⁰ As we can see particularly well in Athens, the variety of kitchen ware increases over time from the Early Iron Age to the Hellenistic period (Rotroff this volume), indicating the development of an increasingly elaborate cuisine, as well as of practices of conspicuous consumption linked to increased social stratification (see also below, section 5D).

For later, and notably modern periods (Day, Cau *et al.* this volume; Kyriakopoulos this volume), the far greater breadth and finer resolution of data allows a better understanding of the complexity and development of kitchen ware production and use, which in turn – together with practical experiments (Morrison *et al.* this volume) – can also inform approaches to earlier material. Among the phenomena such work highlights is the diversity of nomenclature for pots (Kyriakopoulos this volume; Donnelly this volume), which is tied to extensive inter-cultural contacts as well as (sea) trade in utilitarian pottery, notably cooking pots and *pithoi* (*cf.* also Whitbread this volume).

3. Ceramics and cuisine: reconstructing ancient practice

If we want to understand ancient foodways and cuisine and use them as a window onto past cultures and societies, we first need to understand the character and development of cooking techniques and practices as it is reflected in ancient kitchen ceramics and installations. A variety of approaches can be employed to investigate the elements and steps that make up the culinary *chaîne opératoire*, as well as the socially and culturally constructed ideas behind them.

A The cost of cooking: installations, fuel and the socio-economic dimension of cuisine

We can begin to appreciate the importance of varied approaches by considering how the practice of cooking food over a fire (Fig. 1.3), as the main way of processing food to make it fit for human consumption and to release its nutritional value (Gremillion 2011, 24-26, 66-69; Montón Subías 2002, 10), has a wealth of wider implications – relating to economic considerations, such as fuel consumption, time input and division of labour, but also culturally constructed preferences, *e.g.* for or against certain ingredients and cooking practices. A multitude of questions and issues needs to be borne in mind: for example, direct contact with fuel may be economically more efficient but allows less control than a “hot-plate”; charcoal may reach higher temperatures and provides a more even heat and better heat regulation than firewood, but of course we may not always be able to determine

what fuel was used or indeed available. What is frequently preserved, however, are remains of cooking installations, such as supports and hotplates (Morris 1985; Banducci this volume) but also ovens and hearths, which have recently received increased attention in archaeological, ethno-archaeological and scientific studies (Gur-Arieh *et al.* 2013 and 2014; Papadopoulou and Prévost-Dermarck 2007; Papadopoulou and Maniatis 2013).

Experimental archaeology, in which cooks work with an ancient setup (Morrison *et al.* this volume), as well as ethnographic parallels for archaeological kitchen pottery (Banducci this volume) can provide valuable additional insights into the cooking process and its wider implications. Among other things, they remind us of the extent to which economic costs also lie in the investment of time and labour: a single-pot meal that is left unsupervised on a low regular heat means far less work than the preparation of several dishes cooking at higher heat, requiring constant attention, such as stirring or changing between pots, which may entail access to servants or slaves. In her chapter in the present volume, Banducci, takes us directly inside the *culina*, where food recipes, processing techniques and cooking times need to be carefully considered. As a case study, her analysis demonstrates that morphological changes in pottery cooking stands intersect with fuel choices, nutritional regimes and cooking practice (*e.g.* slow-cooking legumes rather than faster-cooking meat as the primary protein source) and thus can shed light on larger phenomena *e.g.* of developing urbanisation and social stratification.

B Questioning the pot, I: shape and function

When looking for the ancient function, or intended use, of a pot, it is first and foremost its shape and its material that we can turn to. The relative openness of the vessel profile, rim diameter, and volume in particular are widely regarded as predictors of use (Smith 1988, 914; *cf.* Rice 1987, 224–226). Cooking pots with wide mouths enable easy access and fast evaporation – good for dishes that are meant to thicken liquids and require frequent stirring. A cooking pot that is at least as deep as it is wide (such as deep *ollae* or *chytrai*) reduces the relative surface area so that liquid evaporates more slowly and is thus useful for food with a high liquid content – such as porridges, stews and broths. Narrow bases are ideal for immersing in embers; broad bases function better with hearths/cooking stands. Tripod legs add stability. A rounded base is particularly efficient in terms of thermal shock absorption and heat distribution. Wide open vessels with shallow bottoms are suitable for roasting, sautéing, frying, or baking.

Scholars have been successful at reconstructing cooking practice at least partly from vessel shape (see Lis this

volume) – also in conjunction with the shape of cooking stands or hearths – and there is indeed a wealth of evidence for very specific shapes with very specific functions *e.g.* in traditional modern Greek pottery (Kyriakopoulos this volume). Yet not always is function “obvious”. Some pots were certainly designed to be multi-purpose, others may have become so when used creatively, in (presumably) non-intended ways: while the apparent absence of facilities for baking bread (no ovens, few griddles) in the Mycenaean mainland has been noted (Lis this volume), cooking experiments with Cretan cooking pots (Morrison *et al.* this volume) show that pans, turned upside down and placed on supports, can be used for baking as well.

Finally, we need to remember that cultural traditions, symbolic meanings and manufacturing processes, too, may have an impact, so that not all features of a given shape are thus necessarily purely functional. This is probably true even more so for the selection and processing of raw materials – the mechanical and thermal performance of a cooking pot is important, but does not always account for choices and changes in a potter’s practice (on which more below, section 4C).

One further factor, finally, is vessel size: though the size of a cooking pot may be related to the size of the commensal/eating group, more complex reasoning is often required (Goody 1982, 86–87). Thus, ethnographic research suggests that, in large assemblages, multimodal distribution of cooking vessel sizes is a good indicator for large scale feasting (Clarke 2001, 157–162), while developments towards smaller dimensions in cooking pots might be linked to a greater variety of meals and greater frequency of their preparation (Lis this volume).

C Questioning the pot, II: use-wear and residues

Direct evidence of use, such as traces of attrition or organic residues, provide valuable evidence for ancient cooking practice and foodways. The potential of use alteration and use-wear analysis has been highlighted most explicitly by Skibo (1992; for a recent methodological review see Vieugué 2014). It has been successfully employed, for example, to demonstrate the multifunctionality of the earliest Neolithic pots in Bulgaria (Vieugué *et al.* 2009; for different shapes used for similar functions in the Middle Ages, see *e.g.* Salvini *et al.* 2008). In Aegean prehistoric and Classical archaeology, sooting patterns (Skibo 1992, 14–73; Hally 1983) are the most frequently observed and studied type of use-wear. Localised burn marks on cooking pots vary depending on the relative position of the pot to the fire and may thus be indicative of culturally-specific cooking practice (Lis this volume, Fourrier this volume; *cf.* also Ben-Shlomo *et al.* 2008; Yasur-Laundau 2006). As some scholars have noted, however, interpretation is

complicated by the presence and appearance of sooting patterns being subject also to other factors (Morrison *et al.* this volume; Gur-Arieh *et al.* 2011 and 2012). Similarly, attrition patterns may be influenced by surface coating with resin that lowers abrasion rate (*cf.* Cramp and Evershed this volume; Morrison *et al.* this volume) or by activities not directly related to food preparation, such as cleaning or storage, or post-depositional damage. Once again there is a clear need for a well-considered integrated approach that takes into consideration anthropological and experimental archaeology as well as residue and use-wear analyses.

Food residue analysis has been a growing field of study over the past decades, yielding important insights *e.g.* by attesting far more diverse uses – involving a wide variety of foodstuffs – of transport amphorae than hitherto assumed. Its progress and results, but also the limitations of the techniques, are highlighted by Cramp and Evershed in the present volume.¹¹ One fundamental problem is that it must remain unclear whether detected residues suggest a mixture of ingredients present at the same time or successive phases of use, such as multiple cooking episodes with different ingredients.¹² Equally, the use of sealants such as pitch or beeswax (not just in amphorae but also *pithoi*, cooking pots and other vessels – see also Morrison this volume) as well as the differential preservation and degradation of different types of residues impact on what can or cannot be traced. “Recipes” extracted from analysis of Greek Bronze Age pottery presented in exhibition *Minoans and Myceneans – Flavours of their Time* (Tzedakis and Martlew 1999; Tzedakis *et al.* 2008) are therefore often seen with a certain skepticism (Voutsaki and Valamoti 2013b, 6).

D Assemblage and context: archaeobotanical, zooarchaeological and osteological contributions

Context is vital for reconstructing practices and their possible social and cultural meaning. For kitchen pottery, context means the archaeological assemblage and its spatial dimension, but also the archaeobotanical and zooarchaeological remains of a site or region that constitute the environmental background to cuisine. The analysis of spatially associated sets of utensils and vessels may shed light on the complexity of cuisine in a household or site and as developments and difference within it (*e.g.* da Silva this volume), as well as on culinary praxis, cooking sequence and consumption habits (*e.g.* Lis this volume; Morrison *et al.* this volume – see *e.g.* also Rutter 2004; Tiverios *et al.* 2013; Kerschner 2003). Depending on the type of contexts, we may be able to ask and answer different kinds of questions: Are we dealing with a storage area, a dining room, “kitchen” or waste dump? Are the remains related to ritual or funerary feasting? Does the assemblage reveal the consumers’ status and social hierarchies – or even complex processes of food

procurement? For example, finds of characteristic ceramic jars, *vivaria in doliis*, in rural Tuscan farms are more likely indicative of a local industry of fattening dormice for sale to Roman elites rather than consumption on the spot by the farm’s inhabitants themselves (Meulemans this volume).

Contexts can also provide important additional evidence in the shape of plant and animal remains that can help to reconstruct ancient diet and foodways at site or regional level. Thus, Langridge-Noti’s (this volume) observation of a special type of pan (for egg dishes?) in the archaeological assemblage of a site in Laconia coincides with the presence of chicken in its zooarchaeological record. Especially detailed insights emerge from the analysis of animal bones and their butchery marks, which can reveal not just the species and age groups of animals but also the way they were prepared (*e.g.* cooked or roasted) and consumed (Montón Subías 2002; Isaakidou 2007). The value of an integrated approach particularly when addressing broader cultural, social and historical questions becomes clear, for example, when – as in Schörner’s study (this volume) of diachronic change in Etruscan to Roman Etruria – the zooarchaeological record in combination with pottery studies reveals a different and more nuanced picture than either of the two approaches on their own would allow. The case study by Morrison *et al.* (this volume) shows how both the range of foods consumed and the type of fuel used for cooking may be gleaned from archaeobotanical and zooarchaeological evidence, and in combination with analysis of the pottery assemblage can help to reconstruct a holistic scenario of ancient cooking practice. Atalay and Hastorf (2006) used similar evidence to reconstruct food preparation and consumption at Neolithic Çatalhöyük. Zooming in on the picture at household level, a differentiated approach allows us to see differences in consumption patterns, culinary choices and practices, which may reflect cultural, social or ethnic differences (da Silva this volume; Curé this volume; see also Stein 2012).

E Texts and images

Texts and images are essential sources for understanding ancient cuisine. Recipe books such as the famous work by Apicius, the culinary compendium of Athenaios, but also numerous other references to food, agriculture and trade across textual genres, provide the traditional backbone for studies of diet, foodways, cuisine and commensality in the ancient world (*e.g.* Garnsey 1999; Dalby 1996 and 2003; Wilkins *et al.* 1995; Wilkins 2000; Hill and Wilkins 2006; Leclant *et al.* 2008). Approaches and methods within the field are myriad, ranging from the analysis of cooking vocabulary (Lehrer 1972) to the study of ritual feasts (Detienne and Vernant 1989), and touch on social, cultural and economic issues in many different ways. An important development in recent years has been the

increasing attention paid to the contexts and functions of texts, deconstructing their role as quarries for snapshots of “daily life” (Wilkins 2000). One example of how a careful study of texts can go well beyond reconstructing dishes and ingredients is Donnelly’s (this volume) comparative study of recipe books, which teases out differences and changes in ancient cooking practice – types of cooking installations and fuel, cooking pot shapes and their use, the cooking process – and sets them against cultural and historical shifts.

Of course, the notorious wealth and inconsistency of ancient (and modern) terminologies particularly for vessel shapes inevitably compromises setting textual data in relation to archaeological evidence, and scholarship has long struggled with the problems this causes.¹³ Yet this phenomenon can also be instructive: rich vocabularies may arise out of, and shed light on, cross-cultural contact (Kyriakopoulos this volume), while discrepancies between different categories of evidence – literary, archaeological, zooarchaeological, archaeobotanical – may reflect dichotomies between “common cuisine” and (constructions of) elite consumption (Langridge-Noti this volume).

Images of food production, preparation and consumption – from frescoes in Bronze Age Greece (Pini 2008) to the imagery of the Last Supper (Vroom 2003) – are another important and equally complex, if lesser studied, category of evidence, which helps to understand not just the tools and praxis of cuisine (cf. Sparkes 1962 and 1965), but also its social setting and role in gender and political discourse (Fig. 1.4, cf. e.g. Villing and Pemberton 2010; Villing 2009).

F Learning from experience: ethnographic and experimental archaeology

Taking a step back from the evidence, ethnographic/anthropological and experimental studies can provide important new perspectives on cooking practices (e.g. Skibo 1992). For example, contemporary observations on the use (and modern design) of kitchen implements such as pots and stoves (Banducci this volume; Kyriakopoulos this volume) sharpens our eye for ancient usage, as does experimental testing of archaeological hypotheses. An example of the latter is the study by Morrison *et al.* (this volume). Here, replicas of the *batterie de cuisine* of a Late Minoan site in eastern Crete were used to prepare recipes based on archaeobotanical and zooarchaeological finds, thus providing first-hand experience of vessel functionality and the cooking process from the cook’s perspective. Among the questions this raised was the extent to which cooking pots were reserved for a specific functions, as food odour became impregnated in the pots and was not

easily removable – an observation explaining why ancient writers (e.g. Anaxippus *apud* Athen. 403e-f; Galen 291) occasionally specifically call for the use of a new ceramic cooking pots. Together with the stress of repeated exposure to cycles of heating and cooling, this absorption or build-up of food residues (which in wealthier households might have resulted in just a single use of a pot: Gascoigne 2013) must have contributed to the well-attested short use-life of ceramic cooking pots of usually no more than a year or two (e.g. Nelson 1991; cf. Rice 1987, 297–304; Peña 2007, 57–58).

Anthropological studies and experimental archaeology are equally important for understanding the production of culinary ceramics, including the question of the extent to which their (intended) use shaped the production process (e.g. Arnold 1985; Livingstone Smith 2000). An extensive body of anthropological research is today available that helps us understand how environmental, cultural, social, and economic processes impacted on pottery production, from studying the *chaîne opératoire* (e.g. Gelbert 2003; Livingstone Smith 2007 [2000–2001]) to the impact of cross-cultural contact (e.g. Smith 2003; Yasur-Landau 2005). For the Mediterranean region, the pioneering ethnoarchaeological and experimental work of Roland Hampe¹⁴ or the collections and observations of Betty Psaropoulou (Psaropoulou 1984) are especially valuable in the light of ancient pottery traditions today largely being extinct (Kyriakopoulos this volume).

Integrated approaches that combine looking at living pottery-making traditions at workshop level with the scientific analysis of clays allow us to probe issues such as specialisation, reputation and consumer perception on a level of detail that is rarely possible for ancient times (Fig. 1.5). Thus, the case study by Day, Cau *et al.* (this volume) on the kitchen-pottery producing centre of Pòrtol on Mallorca examines the changeable relationship between specialised raw materials and perceived technical performance, providing valuable comparative evidence for assessing processes of production and consumption e.g. on the islands of Aegina and Siphnos that were equally famous for their cooking wares in (ancient and recent) Greek history (Gauss *et al.* this volume; Whitbread this volume; Kyriakopoulos this volume).

4. From the social turn to the scientific revolution: the material perspective

One of the fascinating aspects of looking at ancient kitchen pottery today is the way scientific techniques and approaches have developed in recent decades. Increasingly sophisticated methods allow us to go beyond morphometric aspects of shape towards a deeper understanding of ceramic

traditions, trade and culinary practice, as an integral part of meaningful social and historical interpretations.

A What can scientific analysis of “coarse ware” pottery tell us?

Scientific research is fundamental to characterizing the different phases of the operational cycle, *chaîne opératoire* and indeed the whole life cycle, or “biography” of a pot: from the choice of raw materials and their provenance (e.g. Rice 1987, 371–404 and 413–424; Maggetti 1982) to clay and temper selection, paste preparation, making and firing (e.g. Tite and Maniatis 1975; Heimann 1982; Rice 1987, 113–166; Livingstone Smith 2007 [2000–2001]), and possibly later on seasoning (such as soaking or coating in resin or beeswax), using, maintaining, repairing, or repurposing (e.g. Skibo 1992; Naschinski 2001) – at each step along the way providing data that is vital for understanding the wider social, economic, cultural and historical phenomena that underlie a vessel’s creation and use.

Numerous scientific tools and methods are today available for the investigation of pottery, and a great variety of them have been used to achieve the results discussed in the present volume, including optical microscopy in thin section (Fig. 1.6), Fourier transform infrared spectroscopy (FTIR), gas chromatography mass-spectrometry (GC-MS), computer models, X-ray diffraction (XRD), and scanning electron microscopy used with energy dispersive spectrometry (SEM-EDX).

The choice of technique depends on the research questions (e.g. Kilikoglou *et al.* 2002). Techniques such as GC-MS and use-wear analysis, for example, can be employed to determine whether a “cooking pot” was actually used for cooking. Cramp and Evershed (this volume) highlight the use of GC-MS in their extensive review of the organic products (animal fat, plant oils, resins, gums, waxes, *etc.*) that may have left residues on kitchen pottery in helping to reconstruct patterns of ancient diet and trade. Detailed insights into a vessel’s actual use within cooking practices may be gained by the study of abrasion (use-wear traces) or the spatial distribution of clay ribs on the vessel surface (Vieugué *et al.* 2010; Skibo 1992; see also above, section 3C). It is important to remember, however, that just as the function of an individual pot can change during its “lifetime” (e.g. Fourrier this volume; Kyriakopoulos this volume), so may the function of a category of pot over longer periods of time (such as the *pithoi* in Cullen and Keller 1990). An example of how typology is not necessarily reliable in determining the use of the artefact is the study by Pecci (2009, 37), who showed by GC-MS analysis that amphorae used over a long period of time for wine later contained a different product (*garum*); indeed, for

amphorae in particular re-use is widely attested (cf. e.g. Lawall 2011). That not only pottery but also ovens and hearths can be a worthwhile area of scientific investigation of ancient cooking practice is demonstrated by recent examination of their heat exposure and ash contents (Gur-Arieh *et al.* 2013 and 2014; Papadopoulou and Maniatis 2013).

For the present volume, particular emphasis has been placed on including innovative scientific approaches. The question of how a vessel’s fabric relates to its “cooking behaviour” is explored by Müller *et al.* (this volume), who assess the influence of phyllite temper on a fabric’s mechanical and thermal properties by using experimental clay briquettes and firing them at different temperatures. Hein *et al.* (this volume) use computer modelling to quantify the heating efficiency of ancient pots and demonstrate how this is influenced by a pot’s shape (cylindrical vs globular), thus adding one more technique to our scientific toolkit for investigating kitchen pottery functionality.

B Functionality – did it matter?

Cooking pots, storage jars, water containers, mixing or grinding bowls all had their specific practical functions in daily life; the wealth and well-being of the pots’ users depended on how well they fulfilled their roles. Scholarship has been increasingly aware of the importance of functionality, realising that a plain appearance might belie a sophisticated performance, with a “coarse” fabric quite possibly chosen specifically to improve cooking behaviour or durability.

From a Classical Greek perspective, striving for superior functionality was appreciated as an essential part of the potter’s (artful) craft, *technē*. The tombstone of the 4th century BC Attic potter Bacchios¹⁵ characterises potters as “those who blend earth, water, fire into one by *technē*”. According to Plato, a work of *technē* was made with knowledge of function of the crafted object, and with the aim to make it work well – and in this sense, a well-made pot could be called beautiful (Plato, *Hippias Maior*, 288.d). Consumers’ perception of performance translated into economic success: the *Talmud Babli* Shabbat 120b, compiled in Late Antiquity, notes the superior heat resistance of vessels manufactured at the major cookware production centres of Kefar Shinin and Kefar Hananya in Galilee (Peña 2007, 372 note 20).

Archaeological, anthropological and scientific observations, too, suggest that consideration of a pot’s performance could form an integral aspect of pottery production and consumption. It probably contributed to the phenomenon of craft specialisation among potters – including the specialised production of *pithoi* (Fig. 1.7; cf. Giannopoulou 2010) or workshops (or even villages) dedicated to cooking



Figure 1.5. Hindwari, Pakistan (2003): potters beating water jars with a wooden paddle against a clay anvil to thin the walls and increase the volume. Photograph M. Spataro.

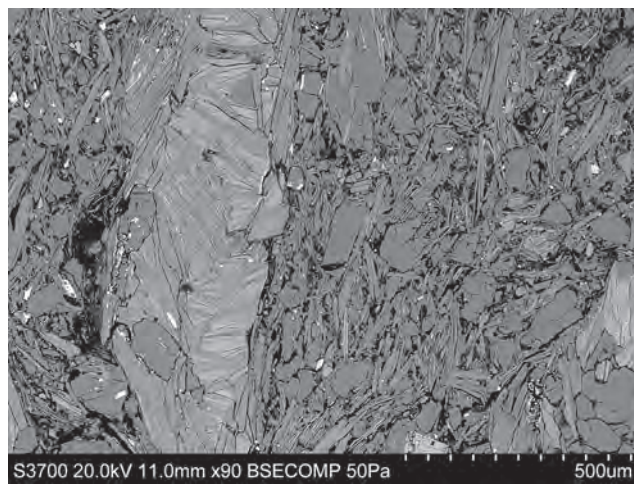
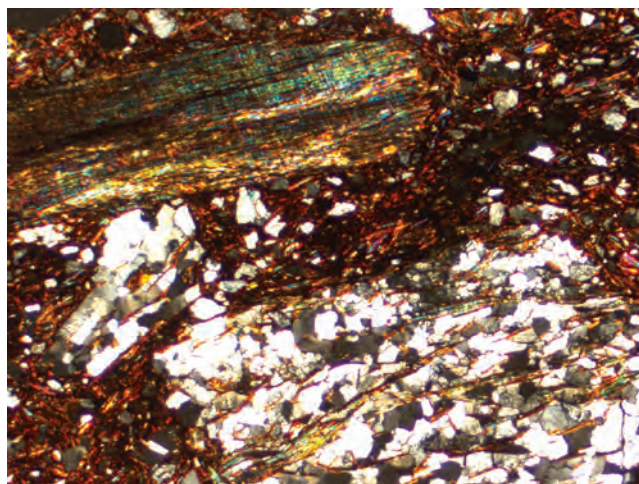


Figure 1.6. Scientific analyses of cooking pots can highlight functional choices, such as coarse mineral or rock fragments added as temper possibly to improve thermal shock resistance properties. Micrograph of a thin section (on the left) of a cooking pot from recent excavations in the Archaic settlement at Miletos (inv. Z92.132.4), showing fragments of mica-schist and clusters of lamellae of muscovite (cross-polar field of view 3.5mm); on the right, a back-scattered electron image of the same sample showing the mica schist on the left. Photographs M. Spataro.

pot manufacture (Day, Cau *et al.* this volume). We see it especially in the apparent correlation between certain types of fabrics or manufacturing techniques and certain vessel shapes (*e.g.* Rotroff 2006, 49) – a development

closely linked with increased craft specialisation (Winther-Jacobsen this volume). A prime example for such a correlation is water jars: the best water jars have a porous fabric that allows for evaporation to keep the water cool

(Schiffer 1998), but are also light-weight, durable and easy to use – a combination successfully achieved in the widely exported modern Siphniot water jars (Kyriakopoulos this volume). Storage of other goods, on the other hand, may require insulation and impermeability. This could be achieved post-firing by applying sealants such as wax or resin (Cramp and Evershed this volume; cf. also Psaraki *et al.* 2013, 98) but also already in the potter's workshop. We see this in *pithoi* from the Geometric settlement at Zagora (McLoughlin 2011), the morphology, fabric and finishing of which seem deliberately geared to maximise functionality. The largest *pithoi* (large enough perhaps to hold a family's yearly grain supply), for instance, have thick, dense and highly polished walls that sintered during firing and thus formed an impermeable outer skin as a buffer against temperature and moisture fluctuations: optimum dry-storage conditions for valuable supplies of wheat or barley.

For cooking pots it is properties such as strength, toughness, thermal shock resistance (cf. above Fig. 1.6), heating efficiency *etc.* that have been identified as particularly important. As Whitbread (this volume) notes, cooking pots at Archaic and Classical Berbati in the Peloponnese were manufactured using specific fabrics rich in quartz likely to increase toughness (Kilikoglou *et al.* 1998), although other materials were available and were used to make other types of pottery. It is likely that also the widespread popularity of Aeginetan cooking pots lies at least in part in their superior functionality (another important prerequisite would have been the existing wide Aeginetan trade networks), based on similar clay recipes in use from the Bronze Age to the Classical period (Gauss *et al.* this volume).

C Technical choices and socio-cultural identity – two sides of the same pot

The mechanical and thermal performance of a cooking pot, however, does not always account for potters' technical choices (see Kilikoglou *et al.* 1998; Tite and Kilikoglou 2002; Hein *et al.* this volume; Müller *et al.* this volume; Whitbread this volume; Winther-Jacobsen this volume). Although potters are often aware of the functional consequences of choosing different raw materials – both clay and temper – ceramic formulae which confer no obvious functional advantages can be maintained for centuries (Spataro 2010), as traditional formulae are often linked to cultural (and social) identity. In contemporary sub-Saharan Africa, for example, clay preparation techniques and the choice of tempers are frequently less determined by “objective” environmental, technical or functional requirements, but are subject to a variety of social and cultural factors, which often influence different aspects of pottery manufacture – fabric, shaping, decoration, firing – in different ways



Figure 1.7. In the 19th and early part of the 20th century, the potters of Phini in Cyprus were famous for producing large *pithoi*, travelling across the island with clay and tools to make and fire pithoi on the spot. A museum dedicated to the craft was established by Theophanis Pilavakis, son of one of the main pithos-producing families. Photographs S. Ebbinghaus.

(Livingstone Smith 2000; Gosselain and Livingstone Smith 2005; Gosselain 2011).

Similar complexities also emerge from archaeological and scientific analyses. Winther-Jacobsen's (this volume) study of patterns and possible reasons for technological change in the pottery of Hellenistic Cyprus suggests that potters' awareness of utilitarian performance characteristics played an important role in the development of specialised cooking ware fabrics, yet also finds that this only applies to certain periods and areas of the island. Whitbread (this volume) studies changes in the recipes of cooking pots and the concomitant “material choices” made by potters in the Peloponnese from the Neolithic to the modern period. Supra-regional, long-term preferences for certain types of temper are lacking here, with different locally developed recipes in use and clearly deemed to be perfectly functional – a diversity partly determined perhaps by cultural preferences. Ethnographic parallels from the Andean region cited by Whitbread highlight that both potters and consumers can have strong views about raw materials and their role in making good cooking wares, and suggest that culturally/socially determined perceptions of performance could be powerful factors in influencing potters' choices and consumers' preferences –

conclusions that closely echo the picture in sub-Saharan Africa. Kitchen pottery and the technology involved in its production, just as the culinary practice it serves, is not merely a technical but also an intensely social and cultural phenomenon.

Change, then, rarely seems to occur for purely functional reasons (Skibo and Schiffer 2008), with cultural and social factors playing as much, if not a greater role. This also includes the movement of people: just as emigrants may bring with them new foodways and new pottery shapes, they may also introduce new pottery techniques. New and “foreign” fabric recipes and firing techniques in vessels made of local clay (“Handmade Burnished Ware”) at Late Bronze Age Tell Kazel, for example, have recently been connected with the movements of the Sea Peoples between the western Mediterranean and the northern Levant (Boileau *et al.* 2010). Especially pertinent is the analysis by Müller *et al.* (this volume) of changes in the kitchen pottery of Bronze Age Akrotiri (Thera). Here, a replacement of granite temper with phyllite can be observed in an otherwise unchanged local clay recipe. Increasing functional suitability does not appear to be the driving force for this innovation: though fabrics tempered with phyllite have greater fracture strength, they have lower thermal shock resistance and worse thermal conductivity than those with granite. Of course, as Müller *et al.* point out, material properties do not necessarily translate directly into actual cooking performance; what constitutes good cooking performance may, moreover, depend on the type of cooking – sometimes lower heating effectiveness may actually have been desirable (Skibo 1992, 29, 37; Skibo and Schiffer 2008, 39–40). Nevertheless, the most likely explanation for the change lies outside the purely technical realm: as is also apparent in the adoption of a new vessel shape, the tripod cooking pot, Minoan Crete had a profound influence on Thera at the time, perhaps involving also the presence of Cretan potters on Thera, for whom the use of phyllite as temper had a long tradition. The lasting effect of this interaction not just on cooking but also craft practice is apparent from the fact that the same fabric was still used on Crete for cooking pottery in the Geometric period (Boileau and Whitley this volume).

5. Food, feasting, identity: social approaches to ceramics and cuisine

In the world of Classics, the topic of food preparation and consumption had long remained a marginal area of study, relegated to rarely more than a footnote in studies of ancient “daily life” (*e.g.* Bruns 1970). It was not until the 1980s and 90s that a sudden surge in interest in the social

context of the consumption of food and especially drink began manifest itself that shows little sign of abating.

A Communal feasting and the symposion

Communal eating and drinking fulfills crucial functions in social interaction, integration but also differentiation (Fig. 1.8). A prime example is the *symposion*, the Greek drinking party, which since the 1980s has been the subject of intense analysis by Classicists.¹⁶ Through the lens of texts and images, discussion focused primarily on the *symposion*’s political, social and intellectual significance and the discourse of drink and food within the ancient Greek polis (Davidson 1997; Wilkins 2000) as well as its supposed “export” to other areas of the ancient world. Even though fineware pottery drinking sets, their use and especially their decoration were closely studied, cooking pots and other evidence of foodways tended to enter the discussion only indirectly, via textual sources. Here, the flourishing discourse on food was seen as largely “in the mind”, divorced from actual reality of cooking and gastronomy that was held to be largely static (Wilkins 2000, xxv, *contra* Dalby 1995).

While archaeologists sporadically contributed site-specific contextual studies of ancient Greek cooking and dining practice in both public and domestic (*cf. e.g.* Rotroff and Oakley 1992; Foxhall 2007b; Lynch 2011), more ambitious analyses were advanced especially in relation to religion, with ritual dining (Bookidis *et al.* 1999; Schmid 2006) but also cooking and butchering practices in ancient Greece (Detienne and Vernant 1989; Ekroth and Wallenstein 2013) attracting increasing attention. In a parallel development, the social dimensions of communal feasting began to take centre stage also in prehistoric Aegean studies, influenced particularly by sociological (Goody 1982) and anthropological approaches. Here, too, the focus was especially on drinking and drinking vessels, with discussions revolving around the social and ritual function of special feasts, and how commensality shaped social relations through social integration and differentiation,¹⁷ part of a general increasing scholarly fascination with the topic of the “feast” as a sociological phenomenon (*e.g.* Dietler and Hayden 2001; Jiménez *et al.* 2011).

B Ceramics, cuisine and identity

There is a long tradition in anthropology of examining the social aspects of cooking. From a structuralist perspective, Lévi-Strauss’s culinary triangle of boiling, roasting and smoking,¹⁸ takes the (nutrient-efficient) boiling of meat as a cultural way of cooking because it uses a receptacle to hold water, and (higher-loss) roasting as a natural way of

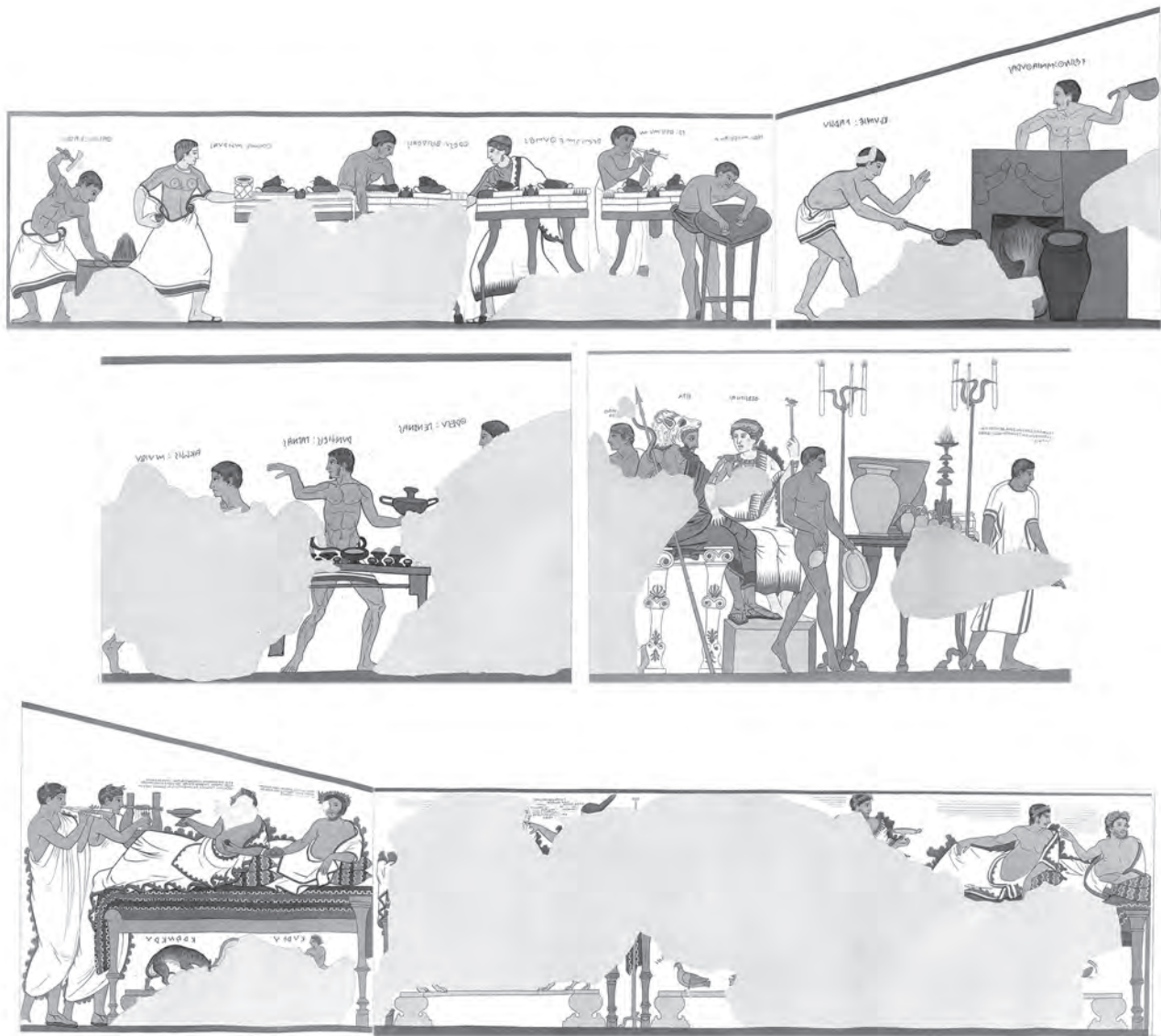


Figure 1.8. Greek style vessels and furniture and the presence of cooks and servants denote the high status of the diners reclining at an imaginary funerary banquet. Drawing of sections of a wall painting in the 4th-century BC Etruscan Tomba Golini I in Orvieto. After B. Conestabile, *Pitture murali a fresco e suppellettili etrusche in bronzo e in terra cotta scoperte in una necropoli presso Orvieto nel 1863 da Domenico Golini*, Florence 1865.

cooking because it directly exposes meat to the fire without a receptacle. In this conceptual model, then, cooking pots and other kitchen tools become charged with both practical and symbolic meaning – implying, moreover, social and gender distinctions, with boiling associated especially with women, domestic space and small closed groups and roasting with the domain of men. From the perspective of social practice, an approach explored especially by Winther-Jacobsen in this volume, connotations such as these are generated through *habitus* – with cooking as an embodied routine that forms part of the *habitus*. Acquired

through socialisation from a young age, it constantly replicates and creates – and hence also re-shapes and innovates – social patterns and structures (Bourdieu 1977, 96–158; cf. also Hastorf 2012).

Deeply embedded in notions of individual and group identity, foodways (and with them kitchen pottery) are thus sometimes viewed as virtually “unconscious” and slow-to-change structures – particularly so if tied to religion. Special ritual foods and food taboos (Simoons 1994; Douglas 1972; 1999) that survive centuries or millennia are but one example of seemingly static practice, with related kitchen



Figure 1.9. The processing of grain is traditionally a female responsibility in many cultures and is taught and generationally transmitted: a group of four women are dehusking grain by pounding and winnowing. 19th century painting from Patna, India. British Museum, Asia 1989,1020,0.2.1. Photograph © The Trustees of the British Museum.

pottery, too, slow to change – from special pots for festive Orthodox dishes in modern Greece (Kyriakopoulos this volume) to a long-lived type of casserole with a close-fitting lid that may have specially suited Jewish concerns for purity (Hayes 1997, 474). In addition, kitchen pottery's (seemingly) obvious functionality has further promoted assumptions of immutability: why change something that fulfills its function well, and is too mundane to be the subject of “fashions”?

Far from being static, however, the social and cultural aspects of foodways, cuisine and commensality can drive change at least as much as they encourage tradition (Goody 1982, 33–39). Cooking, serving and drinking practices may evolve as a part of cultural evolution, social formation and diversification, class competition or cultural interaction; they may change due to knowledge exchanges via social networks that include technical transmission and innovation as regards both food preparation and related tools and installations. In all these contexts kitchen ware has the potential to be a powerful heuristic tool to help identify the presence and movement of people, the social and ethnic make-up of communities as well as their interaction and concomitant transformation.

Yet this potential has been slow to be realised for the Mediterranean world, and notably in areas and periods

rich in textual sources. Major landmark studies on food have paid little heed to household pottery.¹⁹ It was not until the publication of volumes such as *Cooking Up the Past. Food and Culinary Practice in the Neolithic and Bronze Age Aegean* (Mee and Renard 2007) that kitchen pottery in its culinary context became to be interrogated in-depth, using archaeological and scientific alongside zooarchaeological and archaeobotanical methods, to address the relationship between food, social organisation and identity – a trend that keeps growing, with increasing attempts at integrating diverse approaches, including residue analyses (e.g. Giorgi *et al.* 2010; Notarstefano 2012; Voutsaki and Valamoti 2013a and b).

C Cooking and gender

In many societies, ancient and modern, cooking falls largely into the female sphere of domestic responsibility and is transmitted from mother to daughter (Fig. 1.9).²⁰ That this gender division holds fundamentally true also for much of the ancient and “classical” world is clear, for example, from the particular (ritual) symbolism accorded to kitchen utensils in ancient Greece. On the wedding day, the bride brought the parcher and pestle for processing grain to the groom's house, highlighting



Figure 1.10. Diversification of shapes and the appearance of fine-ware “novelty” versions of standard cooking and stew pots indicate the raised profile of cooking and cuisine in Classical Greece: a) *chytra*, from Rhodes, British Museum GR 1864,1007.1937; b) black glazed miniature *chytra*, from Rhodes, British Museum GR 1864,1007.336; c) *lopas*, from Rhodes, British Museum GR 1864,1007.1802; d) black-glazed *lopas*, British Museum GR 1999,0928.1. All photographs © The Trustees of the British Museum.

the significance of grain as a staple food and marking its processing as part of the female sphere (Villing 2009). The butchery aspect of food preparation, by contrast – not least perhaps because of its link with the hunt – is commonly a male domain (for ancient Greece, see *e.g.* Detienne and Vernant 1989). Cooking and cooking ceramics is thus one of the few areas where activities of women can, with a degree of likelihood, be specifically approached in the archaeological record – a notion exploited particularly in studies of colonial and other cross-cultural encounters and the concomitant transmission of food practices (Mills 2008, 252–253; Dietler 2010, 189). For example, as Fantalkin (this volume) argues, the presence of Canaanite cooking wares in Egyptian strongholds in LBA Palestine may suggest intermarriage between Egyptian soldiers and Canaanite women. Similarly, Stein’s (2012) analysis of butchery and other food preparation practices – notably through cookwares – in 4th millennium BC Mesopotamia points to intermarriage as a key element in the interaction between populations of local and Uruk origin. Similar conclusions are also reached by Smith (2003) in his analysis of foodways in the Egyptian-Nubian border region, based on cooking and serving assemblages. There can be a dynamic interplay between the gendered distribution of roles in the food preparation process and other social and hierarchical

structures, when – as is the case in many societies – socially differentiated cuisines involve a re-assignment of gender roles. Thus, in the context of elaborate “high” cuisine such as “court” cuisine, male cooks may take on responsibility for all aspects of food preparation including those that in “low” cuisine are reserved for women (Goody 1982, 100–101, 192–193; *cf.* also Wilkins 2000, for the phenomenon of male “chefs” in Classical Greece).

D Archaeology and the social stratification of cuisine

Taking the lead from Goody (1982), as well as earlier sociologists such as Norbert Elias (1997 [1939]), relationships of power and questions of “class” are among the topics that scholars have been increasingly addressing in recent years: can we trace instances of conspicuous eating and the existence or development of high (*haute*) and low (common) cuisine?

Fundamentally linked to status and wealth, food and access to food could be an effective marker of economic and social distinction particularly in pre-industrial societies, where increased social stratification frequently brought with it increasing complexity in foodways: hierarchies of food and manner that include the consumption of

“luxury” or “semi-luxury” foods, the elaboration of dining customs, and thus the stratification of cuisine (Goody 1982, 140–141, 143–144). Deliberately transcending the basic and repetitive “low” cuisine built around staples, “high” cuisine is characterised not by quantity but by quality and complexity: variety and novelty of dishes that involve luxury ingredients and that, most importantly, require complex, time- and labour-intensive preparation – a cuisine which is executed in a particularly refined and elaborate way that conspicuously displays money, power and access to resources.

Can we tell socially stratified cuisine from the archaeological record? Goody (1982, 99–153) had already noted the existence of class-differentiated cuisines in ancient Egypt, Classical Greece and the Roman Empire (as well as early China, India, Arabia and medieval Europe), largely based on textual and iconographic evidence. Yet archaeological evidence and material culture, too, are excellent indicators for complex food preparation technology and consumption practices (cf. e.g. Miracle and Milner 2002). The Archaic and Classical Greek world is a case in point. In particular, we may point to the increase and diversification of food preparation shapes and the import not only of luxury ingredients but also of specialised kitchen wares such as Aeginetan cooking pots (Gauss *et al.* this volume) and Cypriot and Corinthian grinding bowls (Spataro and Villing 2009; Villing and Pemberton 2010; see also Curé this volume). These developments go hand-in-hand with the diversification of elaborate symposium fine ware (including the appearance of fine black-glazed “novelty” versions of cooking pots, which turn behind-the-scenes kitchen equipment into shapes fit for the table: Fig. 1.10), but also with the rise of specialised (male) personnel (chefs) and generally an increased social visibility of food, cooking and eating (Wilkins 2000, 382–384; Garnsey 1999, 74, 113; Villing and Pemberton 2010).²¹ Reading Rotroff’s diachronic survey of the archaeology of cooking pots at Athens in the present volume alongside Wilkins’s (2000) study of the social discourse of food in Classical Greece, we see that the discourse was intimately related to changes in actual dining practices and the associated food preparation vessels – both studies, in their own way, charting the development of “haute cuisine”. In a different context, the large numbers of grinding bowls (*mortaria*), cooking pots and amphorae found in elite Archaic Cypriot tombs (Fourrier this volume) equally testify to the richness of a household’s *batterie de cuisine*, which could serve as a marker of social stratification through conspicuous display of wealth.²²

Already for the Aegean Bronze Age, instances of class-differentiated or “haute cuisine” can be detected in elite (palatial) contexts, through the study of pottery, zooarchaeological remains, as well as textual records (e.g.

Hruby 2006 and 2008; Fox 2012, 40–47, 128–132; Isaakidou 2007). Conversely, while a variety of vessels generally does suggest elaborate cuisine, as Donnelly notes in present volume, a limited range of cooking pots does not necessarily have to indicate poverty or lack of sophistication in cuisine.

Clearly, there is much scope for the investigation of cooking and cuisine through well-considered context-sensitive analyses. These may consider the repertoire of the *batterie de cuisine* or special vessels – such as Meulemans’ study of Roman dormice jars attesting the transformation of occasional peasant food into labour-intensive novelty foods for elite conspicuous consumption. They may look at cooking practices and recipes, with cooking installations, use-wear and archaeobotanical and zooarchaeological evidence providing information on the socio-economic resources – fuel, ingredients and time – expended on cooking (Banducci this volume; Lis this volume). They may also take into account transport vessels such as amphorae, which speak of how food became commodified in a socio-economic context of valuation, desire and exchange, as well as storage vessels: with food in pre-industrial societies a treasured commodity that consumed the greater proportion of family incomes, it is not surprising that also the storage of food might incorporate an element of social differentiation and conspicuous display (Garnsey 1999). A prime example are huge and sometimes elaborately decorated storage jars, *pithoi* – prestige items made by specialist potters who invest a great deal of skill, time and effort – that are the material expression of a household’s wealth in food (Ebbinghaus 2005; see also Brisart 2009; Giannopoulou 2010; McLoughlin 2011; and above section 4.B and Fig. 1.7).

6. Foodways and ethnicity: cuisine on the move

For the 5th century BC Greek historian Herodotus, foodways constituted one of the distinctive elements that characterise a people’s identity and that set Greeks apart from “barbarians” (cf. e.g. Auberger 2010, 211–226). To this day, ethnic stereotyping is often framed in terms of food habits, with food and food taboos serving to define (ethnic, religious and social) self and others (Goody 1982, 146). Unsurprisingly, the study of foodways and related pottery has thus also entered scholarly discourse on ethnicity. Especially since the 1970s, scholars have been tracing e.g. the spread of the *dolium* (storage jar) and the *mortarium* as well as of foodstuffs such as *garum* as markers of Roman cuisine, and hence indicators of the “Romanisation” of local populations.²³ More recently, it has been the overall *batterie de cuisine* within an archaeological assemblage that has come into focus, and with it approaches that see foodways

and related material culture as subject to negotiation between different cultural, ethnic and social groups (e.g. Voskos and Knapp 2008; generally, Lewis 1997). A number of papers in this volume specifically assess the value of kitchen pottery as evidence for ethnically differentiated cuisines and entanglement in cross-cultural contact zones (Quercia this volume; Curé this volume, Fourrier this volume; Fantalkin this volume). They add to a growing body of studies of kitchen pottery and cuisine on the “fringes” of the Egyptian (Smith 2003), Phoenician (Delgado and Ferrer 2011) Greek (Bats 1988; Dietler 2010) and Roman (Tomber 2013) worlds as well as in the Levant (Yasur-Landau 2006; Ben-Shlomo *et al.* 2008; Birney 2008; Karageorghis and Kouka 2011). Approaches such as these are particularly well suited to tracing long-term developments: a recent analysis of changing kitchen and serving dish repertoires has mapped cyclical shifts from communal to small group dining in Late Roman to Ottoman Greece in accordance with fluctuating economic wealth and social stratification (Vroom 2003). Similar changes have been observed also in other times and places, from Minoan Crete (Day and Wilson 2004) to pre-modern Europe (Wiegmann 2006, 60–64, *cf.* Elias 1997 [1939], 202–285).²⁴

A Pots = people or profit?

Particularly with advances in scientific provenancing of pottery over the past 50 years, there can be little doubt today that not only kitchen and household vessels, but also their shapes and fabric recipes, travelled far and wide across the ancient world. How is this to be explained? There are instances where a reasonable case for “(type of) pot = people” can be made. For example, the locally-produced kitchen wares of Minoan shape and Minoan-type loom weights that are found alongside Anatolian-type vessels in Bronze Age Miletos are likely to attest immigrant Cretans (Kaiser 2005). At Iron Age Koukos in the Chalkidike, the presence of tripod cooking pots and finger-printed griddles uncharacteristic for the region yet paralleled in the Peloponnese and Attica may attest immigrants from the south (Carlington-Smith 2000). Similarly, changes in cooking pottery from Byzantine to Frankish-occupied Corinth may be linked to Frankish newcomers retaining traditional food customs such as meat stews versus pulses (Joyner 1977), a different culinary tradition that was also observed and commented upon by contemporary culinary writers (Donnelly this volume). The small numbers of East Greek cooking pots in the Levant may well be linked to the Archaic Greek mercenaries serving in Egyptian army rather than being random items of trade (Fantalkin this volume).

Conversely, it is more difficult to argue for “pots = people” for the entire 25–30% of the kitchen wares from the Hellenistic Athenian Agora that are non-local (in type

and/or clay) (Rotroff this volume). In 4th and 3rd century BC Euesperides in Cyrenaica, at least half of coarsewares have been identified as imported (Swift 2003). Indeed, the remarkable story of the trade of ancient Aeginetan cooking pots charted in this volume by Gauss *et al.*, including its impact at Athens as recounted by Rotroff, adds further fuel to the long-standing debate between those who see pottery as evidence of trade and those who see it as an “ethnocultural” indicator of migrations or smaller movements of people (Voskos and Knapp 2008).

The success of Aeginetan kitchen pottery over many centuries (mirrored more recently by that of Siphniot cooking pots, Fig. 1.11 *cf.* Whitbread this volume; Kyriakopoulos this volume), for example, is quite feasibly related to superior functionality. But there may also be other dynamics. As Whitbread (this volume) points out, existing exploitable trade networks (particularly relevant for Aegina), access to raw materials, structure of craft production, as well as more culturally and socially determined elements such as the perception (whether justified or not) of quality may all have contributed.²⁵ As far as we know, a mix of factors is also at play in other instances where utilitarian wares were widely traded, such as the Mediterranean-wide export of Cypriot and later Corinthian *mortaria* in the Archaic to Classical periods (Villing 2006; Spataro and Villing 2009; Villing and Pemberton 2010) and the (much later) trade of *pithoi* from Koroni or Thrapsano as far as Egypt or the Black Sea (Blitzer 1990; *cf.* Kyriakopoulos this volume). Phenomena such as these, as well as observations such as that by Boileau and Whitley in the present volume, that half the Early Iron Age cooking wares at Knossos are made from non-Cretan volcanic fabrics, may indeed warrant the conclusion that the trade in cooking wares is a hitherto neglected dimension of Mediterraneanisation in the Early Iron Age.

B The batterie de cuisine in cross-cultural contact zones

The *batterie de cuisine* (here intended as the range of pots and utensils used for cooking and preparing food) can be a useful tool to interpret the relationships between indigenous groups and newcomers, such as in colonial contexts (Bats 1988). An example is 1st century AD Castro do Vieito in north-west Iberia, site of Roman *castrum* at the fringes of the Roman empire (da Silva this volume). Here, pottery evidence suggests that a Roman culinary repertoire was slowly adopted by members of the local community and placed alongside traditional techniques and cooking practices – a process that can be called “Romanisation” only up to a point: as da Silva observes, it is difficult to judge precisely the local meaning and function of the adopted artefacts, which could have been different from that in their



Figure 1.11. Cooking pots from the Greek island of Siphnos were widely traded in the 20th century: cooking pots being fired (left) and stacked on the beach ready for shipment on the beach at Platys Yalos (right). Photographs by Roland Hampe, taken between 1958–1962 (<http://heidicon.ub.uni-heidelberg.de/pool/hampe>) © Universität Heidelberg, Institut für Klassische Archäologie.

original context. Castro do Vieito – as also at the Levantine sites discussed by Fantalkin (this volume) – highlights the fact that the transmission of culinary practice is often negotiated by non- or sub-elite groups (a topic already touched on above in section 5A). This contrasts with the emulation of elite customs by aspirational elites/middle classes as an alternative path of transmission. A classic case for this is the dispersal of Persian courtly drinking customs throughout the Achaemenid Empire (Miller 2011), but the phenomenon is also presumably behind developments in many other colonial (and non-colonial) settings (cf. also Dietler 2010).

Iron Age southern Gaul/Mediterranean France is an area where cross-cultural entanglement, notably between Greek “colonists” and indigenous populations, and its expression in pottery, have received considerable attention for some time (Bats 1988; Dietler 2010; cf. recently Luley 2014). As Curé notes in the present volume, indigenous cooking pots appear to represent only a small percentage of ceramic assemblages in indigenous settlements. Even if, again, imported vessels (including *mortaria*, amphorae, cooking pots and *dolia*) could of course have been used in different ways here than at their place of origin, the find context of these vessels and notably their association with other vessels are strong indications for the introduction of new culinary habits, especially linked to wine preparation and consumption.

Different dynamics can be traced in other areas. Cyprus is an island that for millennia was a vibrant crossroads between East and West (Karageorghis and Kouka 2011). Fourrier’s chapter in the present volume gives a diachronic perspective on cooking ware in Iron Age Cyprus, critically questioning dominant migration-based interpretations (e.g. Birney 2008). Instead, the introduction to the island of Aegean-type and Levantine-type wares – both

kitchen vessels (their use modified from practices in its “homeland”) and vessels related to drinking – is seen more in a context of socio-economic exchange, linked particularly to feasting, which remained a prominent elite habit in the comparatively stable context of Cypriot Iron Age polities.

Undoubtedly the processes shaping the development of cuisine in settings of cross-cultural contact are diverse and multi-dimensional. We see this also in Iron Age Lucania (Quercia this volume), where the *batterie de cuisine* displays varying influence from indigenous, Greek and Roman elements, often with types of different (ethnic) origins coexisting. In many river valleys, the local (impasto) ware is initially preferred to Greek wares, with Greek pottery (e.g. black-glazed tableware) imported and probably locally produced only by the 6th and 5th centuries. By the later 4th/early 3rd century BC new Roman shapes (*olla*, *patina*, *clibanus*) are adopted, alongside previously introduced Greek ones. Yet as Quercia points out, we struggle to understand the full implications of such developments when faced with scarce and insufficiently “deep” information – allowing us at best to chart presence of objects, but not to understand culinary, i.e. social and cultural, practice.

It is here that closer attention on the part of archaeological excavators to kitchen pottery is essential, but also the integration of other disciplines. Cramp’s residue analysis of *mortaria* in Late Iron Age and Roman Britain (Cramp *et al.* 2011; Cramp and Evershed this volume), for example, demonstrates the historical and cultural potential of such work, with the results – among other things attesting the processing of plant matter – underpinning suggestions that the spread of this vessel form across the Roman Empire may indeed be related to the introduction of new culinary techniques (cf. Baatz 1977; Cool 2006, 42–45).

Just how much richer the picture could be becomes

clear when we move to modern periods for which more information is available. What is particularly striking in Kyriakopoulos's survey in the present volume of the ceramic *batterie de cuisine* of modern era Greece is the richness of specialised shapes including their nomenclature (Venetian, Turkish and Greek). They are the product of a highly regionally divided, yet also closely interconnected Mediterranean, in which people, their cuisine and their ceramics are shaped by the natural landscape and environment and as much as by changeable political, economic and social conditions.

7. Outlook

Food and cuisine shape our lives and our history: as biocultural phenomena, diet and nutrition are fundamental to human health and survival; food shortages, surplus, and trade are driving forces in human contact and conflict. Developments such as the domestication and spread of plants and animals have had far-reaching social and economic consequences: we need only to think of the introduction of the potato (Salaman 1949) to Europe, or the suggested impact of the widespread availability of sugar from the New World on the Industrial Revolution in Britain (Mintz 1985). As the chapters of this volume illustrate, foodways, diet and cuisine are essential aspects of human identity and interaction, and the tools – particularly the ceramics – involved in the preparation and consumption of food are vital clues to understanding ancient societies. To give up the secrets they hold, however, they need to be interrogated from more than just a single viewpoint, through the lens of archaeological, archaeobotanical, ethno-archaeological and textual sources and in a dialogue between archaeological, anthropological and scientific perspectives that fosters a critical take on the potential but also the limitations of each method. Bringing together a wide variety of approaches, the present volume thus aims to highlight not just possible paths for future research in the individual disciplines, but above all it aims to demonstrate how a broad outlook and interdisciplinary dialogue can unlock the potential inherent in culinary ceramics to achieve a deeper understanding of ancient foodways and cuisine as an integral part of the technical, social, and cultural history of humanity.²⁶

Notes

1 Pioneering studies in this vein have been conducted since the 1930s, e.g. by Audrey Richards (Richards 1932, cf. Goody 1982, 15–16), though approaches have become increasingly theorised more recently. Still central is the work of Lévi-Strauss 1966, and that of Goody 1982, which exemplifies the new emphasis on the socio-economic and cultural aspects of food that has come to

the fore since the 1970s and 80s. For the Classical world, studies such as Garnsey 1999, Foxhall 2007a or Wilkins 2000 can stand for the range of perspectives taken on food production, distribution and consumption. The past decades have seen a proliferation of journals, conferences, articles, monographs and encyclopedias on food, foodways and cuisine, such as the monumental *Cambridge World History of Food* of 2000 (Kiple and Ornelas 2000) or the journal *Food and Foodways*, launched in the mid-1980s.

- 2 The need for interdisciplinarity and cohesively integrated research is increasingly felt in recent scholarship: Livingstone Smith 2007 [2000–2001]; Voutsaki and Valamoti 2013b.
- 3 Even a recent study (Lynch 2011) of an Athenian Late Archaic pottery assemblage that expressly takes a contextual and functional approach offers a complete catalogue of the fine wares but not the household wares, and devotes over 70 pages to fine ware relating to sympotic practices but only 20 pages to “other household activities”.
- 4 The terminology for this kind of pottery is notoriously problematic and unsatisfactory. The terms “fine ware” and “coarse ware” neglect the fact that some “coarse ware” can actually be rather fine in terms of fabric and carry with them connotations of value judgment, with “semi-fine ware” (i.e. usually simply decorated pottery) occupying an awkward position in the middle. “Cooking ware” or “cooking pottery” unduly privileges cooking even though it is often, *de facto*, also used for other food preparation vessels. “Kitchen pottery” perhaps most neatly describes vessels related to (various kinds of) food processing, but does not necessarily include storage and other potentially food-related vessels. “Household pottery” is broad enough to cover food preparation and storage activities, but theoretically should include all kinds of vessels found in a household – including drinking vessels and “fine wares”. “Utilitarian vessels” or “functional pottery” marks a distinction from more decorated/decorative wares, yet somewhat confusingly seems to imply that fine decorated vessels have no “utilitarian” function. The dilemma ultimately cannot be resolved and many of the above terms are used in the present volume, with “kitchen pottery” probably the most apt to describe the volume’s central (though not only) concern: pottery with a primary function in food processing (and to some extent storage), that is often, though not always and not necessarily, made from “coarser” fabrics than decorated pottery.
- 5 Powell 2003, 164, suggests that this might be due to the clay absorbing moisture from the dough. The passage, alongside another (Galen 577) on the necessity of using a *pithos* of well-fired, “nice-smelling” (i.e. new or well-cleaned) clay for preserving grapes, is an example of the attention paid by medical writers to the nutritional and medical consequences of food preparation practices; see now Wilkins 2013. A further example is the importance accorded to the material of *mortaria* used in the preparation of healing mixtures and special food or drinks for the sick: Villing and Pemberton 2010, 623.
- 6 Much later, al-Baghdadi in his cookery book of AD 1226 favours cooking pots made of stone, followed by pottery cooking pots; “only as a last resort should he [the cook] use pots of tinned copper. There is nothing more abominable than food cooked in a copper pot which has lost its tinning” (quoted after Gascoigne 2013, 6).
- 7 Ionas 2000, 96–97; Lüdorf 1999; Mavrofridis 2013; Karatasiosa *et al.* 2013.
- 8 See Goody 1982, 47, and on the *batterie de cuisine* in the ancient Greek and Roman worlds in particular Sparkes 1962 and 1965; Hilgers 1969; Bats 1988; Rotroff 2006; Cool 2006.

- 9 The interplay between human diet, foodways, ecology and biology has been explored particularly in relation to prehistoric periods: Gremillion 2011; Gosden and Hather 1999; cf. also Halstead 2007; Valamoti 2007.
 - 10 For a similar case study at the site of Velia, see Trapichler 2005.
 - 11 Cf. also Spiteri *et al.* 2011.
 - 12 Or multiple uses for different purposes or reuse as containers for different substances: see Eerkens 2002; Pecci 2009; see also below, section 4A.
 - 13 See e.g. Richter 1935; Amyx 1958; Hilgers 1969; Sparkes and Talcott 1970; Lazzarini 1973–1974; Brommer 1987; Bats 1988; Colace 1992–2005.
 - 14 Hampe and Winter 1962 and 1965; extensive documentation is now available online at <https://www.propylaeum.de/en/classical-archaeology/thematic-portals/rolandhampe/>.
 - 15 *Inscriptiones Graecae* II² 6320.
 - 16 The most recent contributions include Lynch 2011; Topper 2012; Hobden 2013; Węcowski 2014.
 - 17 Parker Pearson 2003; Halstead and Barrett 2004; Wright 2004; Hruby 2006 and 2008; Hitchcock *et al.* 2008.
 - 18 Lévi-Strauss 1966 (reprinted in Counihan and Van Esterik 2007), with the critique e.g. by Goody 1982, 17–29, 216–220; Bourdieu 1977; Douglas 1972; cf. also Detienne 1994, and the essays in Counihan and Van Esterik 2007.
 - 19 E.g. Wilkins *et al.* 1995; Dalby 1996; Davidson 1997.
 - 20 Widely indicated by historical and ethnographic research; cf. e.g. Stein 2012, 53; Dietler 2001; Goody 1982, 71; Montón Subías 2002, 9.
 - 21 The archaeological evidence quite neatly counters Wilkins's (2000, xxv) prediction "we shall find little evidence of luxury sauces" in the material record – as it is precisely the rise of the production, trade and consumption of specialised pottery vessels for making (luxury) sauces that is now evident from archaeological and scientific research.
 - 22 In Cyprus, until recently, "social strata were well distinguished by their crockery, not only the quality (coarse earthenware, finer glazed ware, imported glazed ware and porcelains) but also by the presence or absence of one article or another" (Ionas 2000, 125).
 - 23 Cf. e.g. Baatz 1977, 154–155. The study of Mediterranean Late Roman coarse wares (cooking wares and amphorae), in particular, has developed almost as a field of its own (<http://www.lrcw.net/>).
 - 24 In any such study it needs to be remembered, of course, that absence of evidence does not equal evidence of absence: other materials (wood, basketry, gourds...) or even bread could easily have been used as receptacles and tools for eating, but also for food preparation.
 - 25 In the Roman period cooking wares from the island of Pantelleria, South of Sicily, were traded in the central Mediterranean: Peacock 1982, 77–80.
 - 26 Other possible examples are the introduction of the chicken to Greece from Southeast Asia via Persia (Blench and MacDonald 2000) or the arrival of new crops in Bronze Age Greece that are indicative of long distance communication and trade routes (Valamoti 2007, 100–101).
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HOW TO MAKE A PERFECT COOKING POT: TECHNICAL CHOICES BETWEEN TRADITION AND INNOVATION

MATERIALS CHOICES IN UTILITARIAN POTTERY: KITCHEN WARES IN THE BERBATI VALLEY, GREECE

Ian Whitbread

Introduction

The most important properties of utilitarian pottery reside in the functional roles of form and material. Functions vary considerably in terms of intended and actual use (Skibo 1992, 35–42) but mainly focus on food preparation, storage and transportation (Rice 1987, 208–210). Within these roles cooking places some of the greatest demands on a ceramic body, which has to withstand repeated cycles of heating and cooling during use. In the archaeological and ethnographic records there are several examples of pottery production centres that acquired a reputation for producing good-quality cooking ware, for example the central Mediterranean island of Pantelleria (Peacock 1982, 79–80; Montana *et al.* 2007) during the Late Roman period and Pabillonis in Sardinia (Annis and Jacobs 1989–1990) in more recent times. Such centres often exported their products into surrounding regions, suggesting that cooking pot production either occupied a social niche, that technical capabilities were restricted, or that geologically specific raw materials were preferred, leading to resource specialisation (Rice 1987, 191).

This paper examines the diverse range of factors underlying preferences for cooking pots from particular production centres. In particular, it scrutinises the role of raw materials in determining such preferences, especially where inclusions within the fabric of the pots reflect distinctive regional geology. Recent studies have shown that the quantities and, to a lesser extent, shapes of rock and mineral inclusions are more important than their composition. Nevertheless distinctive inclusion compositions may be used as a sign of quality regardless

of their physical significance in performance, but other key factors such as location of production, distribution networks and the thermal properties of the clay also need to be taken into consideration. These issues are explored through examination of cooking pot production from two major centres in the Aegean: the island of Aegina, where volcanic materials were exploited during the prehistoric to Classical periods; and the island of Siphnos, whose potters used metamorphic resources in the modern period. These materials are compared with the quartz-rich cooking ware found in regional survey and excavations in the Berbati Valley, Greece.

Properties of cooking ware

Pottery used for cooking is exposed to thermal shock when temperature gradients caused by rapid and/or localised heating generate stresses within the ceramic material. Repeated exposure to such stresses can ultimately cause a pot to fracture catastrophically. The problem may be exacerbated by vessel shape and wall thickness where they promote the development of steep thermal gradients, especially between external and internal surfaces. The effects of thermal shock can be reduced by using an appropriate combination of raw materials to harmonise the thermal expansion of components within a ceramic body (clay and inclusions) and by avoiding stress concentrations through use of rounded rather than angular pottery shapes (Tite and Kilikoglou 2002; see also Müller *et al.* this volume). Archaeological evidence nevertheless shows that these

principles were not always followed in the past and that other factors need to be taken into account (Woods 1986).

The interplay of physical properties and how they were perceived by the people making and using cooking pots is a complex issue. This is especially evident when using results from laboratory analyses to gain insight into traditional or ancient values and practices (Kilikoglou *et al.* 1998). In his study of southern Papuan pottery production Rye (1976) drew attention to potential stresses caused by differences in the thermal expansion of common inclusions compared with a “typical low-fired clay”, noting that minerals with low thermal expansion such as zircon, feldspar, augite and hornblende are most suitable, whereas quartz is undesirable for its high thermal expansion and crystalline inversion at 573°C. The thermal properties of these minerals can of course be determined by modern analytical techniques. Woods (1986) argued, however, that choices of inclusion composition may relate more to the nature of local geology than to thermal properties. In particular, she pointed out that since the prehistoric period in Britain quartz sand was widely used as opening material (any natural or added inclusions that aid water evaporation from the clay body when drying a vessel; Gibson and Woods 1990, 206–207) despite its high thermal expansion, and that if this had caused significant problems then potters would most likely have sought alternative materials. The strength of Woods’ argument lies in its focus on archaeological evidence rather than physical analysis, but equally it should not be assumed that ancient potters held no opinions about relationships between particular materials and the performance of cooking pots, whether based on empirical knowledge or meaningful association.

The use of talc serves as an example. For modern fireproof wares Cardew (1969, 75) recommends a “cordierite body”, in which the mineral cordierite is synthesised at high temperatures, c. 1390°C, from a blend of talc, kaolin and alumina (Ansiferov *et al.* 1997). This choice is based on extensive laboratory analyses of the very low thermal expansion rates of the materials involved, including that of the clay component, in this case kaolin, which in itself has significant refractory properties. Although they are working at much lower temperatures (<1000°C) and without the facility of modern laboratory analyses, traditional potters in the Andean region of Cuzco likewise see talc as advantageous; there, it forms the basis of a “cultural recipe” for producing cooking ware (Sillar 2000, 76ff.). The communities of Machaca and Charamoray have a reputation for making good cooking pots using large quantities of talc, chosen in part because the platy particles permit thinner vessel walls. Talc is so strongly associated with high-quality cooking ware that potters at Raqchi claim to be unable to make cooking pots because they lack the mineral. This claim appears to contradict

local archaeological evidence, which includes cooking pots made of volcanic material similar to that used by modern Raqchi potters. Furthermore, potters at the nearby village of Araypallpa make satisfactory cooking pots using coarse, rounded grains of calcite and quartz rather than talc. This example shows that both potters and consumers can hold strong views on associations between specific raw materials and good cooking pots. These associations may arise from experience and be supported through modern materials analyses; nevertheless, other communities can deem alternative materials to be perfectly adequate.

Clearly there is more to the production of a traditional cooking pot fabric than just the composition of inclusions. In addition to heating effectiveness (Schiffer *et al.* 1994; Skibo 1994; Hein *et al.* this volume), two significant physical properties are strength and toughness (Müller *et al.* 2010; Müller *et al.* this volume). In basic terms, strength is the ability to withstand stress without fracture initiation. Toughness is the ability to maintain structural integrity once a fracture has been initiated, as may occur with short-term stresses arising from thermal expansion and contraction. To some extent traditional potters can control these properties by manipulating the structure of pottery fabrics through their selection and processing of raw materials and in using low firing temperatures. Preferred fabric characteristics are the presence of very coarse inclusions, maximisation of porosity and a pottery fabric that is sintered but has limited development of a glassy phase with its accompanying rigidity (Cardew 1969, 77). These are properties commonly associated with traditional cooking wares, but the specific choice of clay can introduce significant variation in ceramic properties. During the late 1st and beginning of the 2nd centuries AD, potters at La Graufesenque in Gaul used non-calcareous, kaolinitic clays to produce a cooking ware that balanced mechanical strength and toughness. The clay body was produced without abundant coarse inclusions and fired at relatively high temperatures of 900–1000°C, but it retained a structure loose enough to resist thermal shock (Picon 1992–1993). Traditional potters at Pereruela, northwest Spain, also used kaolinite (containing weathered granite rock fragments and minerals) to make cooking pots, kilns and metallurgical crucibles owing to its refractory properties, but they mixed it with an equal quantity of red clay derived from granitic and metamorphic rocks to improve the working properties of the clay body (Buxeda i Garrigós *et al.* 2003).

Inclusions and voids in a fabric generate boundaries at which the energy of a crack can be dissipated. Experimental studies (Kilikoglou *et al.* 1998) show that the quantity of inclusions (approximately 20% or more in the case of quartz) is critical for generating a network of microcrack damage zones throughout the vessel wall that can absorb

the energy of a crack, thereby increasing toughness at the expense of strength. The concentration and distribution of inclusions, voids and a glassy phase are therefore central to controlling the mechanical performance of cooking pot fabrics. Inclusion composition remains significant, however, as the degree of debonding between fabric components is a function of their respective coefficients of thermal expansion (Tite *et al.* 2001). Similarly, composition is a determining factor in the shapes of particles and it has been shown by Müller *et al.* (2010) that strength is compromised less where platy rather than rounded inclusions are present. The development of microcrack damage zones explains why quartz could be so widely used in ancient cooking pots, as observed by Woods (1986), despite the high thermal expansion noted by Rye (1976); nevertheless, the thermal properties of quartz have to be considered in relation to the structural properties of the surrounding material.

Cardew (1969, 75 and 77) noted the importance of limiting development of a glassy phase within the fired clay body. In many cases it remains to be seen how far preferences for cooking pots from particular production centres might have been a reflection of the particular clays used rather than the properties of inclusions. Traditional pottery production at Vasanello in west-central Italy (Peña 1992) and at Pabillonis in southwest Sardinia (Annis and Jacobs 1989–1990) offers some insights into this issue. At Vasanello potters made a range of utilitarian ware using four sources of clay, two of which are volcanic in character. One source (Source 3) in particular was preferred for cooking and heavy utilitarian wares. Raw material from this source is composed of alkaline volcanic inclusions in a natural mixture with non-calcareous sedimentary clay comprising poorly crystallised smectite, illite and kaolinite/halloysite clay minerals. Based on a range of mineralogical and chemical analyses Peña (1992) attributed its suitability for cooking ware to the absence of calcite and the abundance of silt to coarse sand-sized inclusions, specifically fine-grained quartz and coarser-grained sanidine feldspar, of which the latter is reported to have a similar thermal expansion rate to the clay. Similar raw materials were exploited at other potteries in the region, demonstrating a widespread and distinct preference for their use in making cooking ware. The presence of abundant inclusions is consistent with the damage zone model noted above for improving toughness. Large sanidine inclusions may be advantageous but this also depends on the thermal expansion properties of the fired clay component. It is also possible that the slightly higher proportion of kaolinite/halloysite noted in Source 3 clays compared with other sources benefited the structural properties of the clay body at the firing temperatures used, which were estimated to be below 900°C.

A clay body incorporating quartz, feldspar and muscovite

mica was used for cooking ware by the potters of Pabillonis. In this case, both potters and consumers considered the selection of raw materials to be critical for cooking pot production. Materials studies identified several factors that appeared to contribute to thermal shock resistance, including the elasticity of muscovite mica plates, the 20% proportion of temper, forming techniques and vessel shape and size. In addition, firing temperatures were kept below 900°C and experiments on a selection of clays indicated that while pottery could be produced at 500°C significant amounts of liquid did not form below 800°C, allowing sintering without the development of a glassy phase (Annis and Jacobs 1989–1990).

The physical properties of inclusions are generally dictated by well-defined mineralogy, but natural clays contain highly varied combinations of clay minerals and inclusions. These can be further complicated where potters have mixed raw materials from different sources while preparing a clay body. As a result, the firing properties of a clay body, as in the development of sintering and a glassy phase, may need to be evaluated in more specific terms to characterise the products of specialist producers. Indeed, the varied compositions of natural clays (and the possible use of mixes) can make it difficult to be sure that materials collected through field prospection are the same as those used by ancient potters. This problem is illustrated in analyses of red and white clays from the volcanic island of Pantelleria, which have been studied in depth during experiments to replicate Late Roman cooking ware fabrics from the island (Montana *et al.* 2007).

The surfaces of cooking pots are commonly treated during manufacture and/or before first use by the consumer with the aim of extending use-life and reducing unwanted flavours (Sillar 2000, 138). Such treatments are usually aimed at reducing permeability of the interior vessel wall, thereby controlling the degree of water absorption and improving heating effectiveness at the expense of some thermal shock resistance (Schiffer *et al.* 1994, Tite *et al.* 2001). Various treatments were used before the advent of glazed cooking pots, such as surface finishes (*e.g.* burnishing or polishing), soaking regimes and the use of organic coatings (Arnold 1985, 139–140; Rice 1987, 163–164; Longacre *et al.* 2000). The latter leave few traces in the archaeological record, but advances in organic residue analysis (Evershed 2008; Cramp and Evershed this volume) have enhanced the feasibility of detecting such processes.

Aside from issues of production, the control of thermal shock is also dependent on cooking techniques. Procedures that incorporate lower rates of temperature change or distribute heat more evenly, such as supporting a pot at a distance from the heat source or heating the whole pot, are likely to reduce the degree of thermal shock within a vessel, thereby extending its use-life. Fireproof pottery

in general is made to resist thermal shock but it can be divided into flameproof ware and oven ware (Cardew 1969, 75). Flameproof ware has to withstand the severe thermal gradients that accompany direct contact with fire. Oven ware is exposed to less extreme conditions; it is isolated from the fire and the vessel as a whole is subjected to heat. Account therefore needs to be taken of the different ways in which cooking pots might have been used. For example, Woods (1986) noted that despite the apparent advantages of using rounded vessel shapes (Tite and Kilikoglou 2002) most cooking pots in Britain, from the prehistoric to Medieval periods, were made with flat bases. This implies that the effects of shape were not appreciated, were minimised by the ways in which these vessels were used, or were considered to be negligible compared to other considerations. For instance, Jung's (2011) study of cooking pots in Late Bronze Age Cyprus distinguishes between round-bottomed Levantine and Cypriot vessels that may have been placed on charcoal and lifted vertically from their settings, and flat-based Mycenaean-style vessels better suited to horizontal movement in relation to a fire, as on the flat surface of a hearth. Similarly, Banducci in the present volume demonstrates the interconnection between cooking pot shape, cooking stand morphology and fuel type. Experimental studies have shown that soot patterns on cooking pots may give further clues as to whether vessels were placed on embers, set over open flames, exposed to wind in open areas or used within enclosed spaces (Gur-Arieh *et al.* 2011).

Ultimately the production and distribution of cooking pots is a function of consumption practices. The diversity of materials, shapes and cooking methods introduces considerable variation in the use-life of cooking pots (Rice 1987, 297). Performance in terms of longevity and heating effectiveness was no doubt an important consideration when acquiring new cooking pots or when comparing vessels from alternative sources, but their value to an individual will also have depended on the vessel's biography and the availability of replacements. Consumers may have been able to exercise choice where different producers were operating within a community or when imported pottery was available from more remote centres. Given its utilitarian role, there is likely to be a practical basis underlying decisions made by consumers of cooking pottery, but socially determined factors should not be discounted even though they may be difficult to isolate (Kilikoglou *et al.* 1998). Consumers in the Kalinga village of Guina-ang, Philippines, gave various reasons for preferring cooking pots from either Dangtalan (the more common source) or Dalupa (Aronson *et al.* 1994). Preferences for Dangtalan pots were justified in terms of strength and durability, whereas consumers who chose Dalupa pots mainly cited their light weight. Additional properties were

also mentioned, though less frequently: appearance, a well-polished surface, clay quality, firing, thickness, good heat conduction and cost. As noted above, strength and durability are important mechanical properties that carry a significant materials contribution. Lightness of weight is also a physical property, in this case reflecting thinner walls, but it can incorporate distinctly personal concerns such as how an individual prefers to handle a pot when it is full or hot. The list of additional properties shows that evaluations are likely to take a range of attributes into account, some being of greater significance than others. Less tangible were the socially embedded exchange networks in which Dalupa potters bartered their wares in Guina-ang (Stark 1994). Potters stayed in the village with a relative or friend and exchanged their products with friends and relatives of their hostess. This type of interaction can serve to propagate the adoption of cooking ware from a particular source, but it also illustrates the potential for consumer choice to be shaped by social relationships and agendas.

This brief discussion shows that a complex range of factors could affect the performance of cooking pots before taking account of any cultural distinctions or preferences held by consumers. The development of production centres with a reputation for making good cooking pots is often associated with access to specific materials, but issues of manufacturing techniques, the preparation and use of cooking pots, and the social contexts in which they were sourced are more elusive variables. Perhaps more than for most types of pottery, a sequence of technological choices (*chaîne opératoire*) continues to be made throughout both the production and the use of cooking pots.

Cooking ware production centres in the Aegean region

Having considered some of the principal issues that affect the production and consumption of cooking ware, the discussion now examines materials issues in terms of two major centres of cooking pot production in the Aegean region, the island of Aegina, situated in the Saronic Gulf south of Athens, and the Cycladic island of Siphnos (Fig. 2.1). These centres – one ancient, one modern – represent cooking ware traditions that exploit raw materials from very different geological terrains. Moreover, both terrains are remote but potentially accessible sources of cooking ware for communities in the Berbati Valley, subject to production and availability in any particular period.

Like the examples of Pantelleria and Vasanello discussed above, the geology of Aegina is dominated by volcanic rocks with sedimentary deposits cropping out across the



Figure 2.1. Map of southern Greece showing the location of places and regions mentioned in the text. Illustration I. Whitbread.

northern part of the island. Two principal types of coarse ware pottery fabric were produced on the island during the prehistoric to Classical periods, both containing volcanic material and commonly identified by eye from the occasional presence of golden (biotite) mica (Gauss and Kiriati 2011, 22). Most utilitarian pottery was made from yellow calcareous clay, whereas red non-calcareous clay was used for cooking ware (Fig. 2.2a; Gauss and Kiriati 2011, 250). During the Middle Bronze Age these wares were distributed to several sites on the eastern side of mainland Greece (Rutter 1993, fig. 12; Gauss and Kiriati 2011, 243; see also Gauss *et al.* this volume and Lis this volume) in the regions of Euboea, Boeotia, Attica, Corinthia, the Argolid and Laconia. In the Classical period Aegina was again a noted source of cooking pots with considerable quantities consumed in Athens and further afield (Farnsworth 1964; Gauss and Kiriati 2011, 23; Klebinder-Gauss 2012, 89–190, 173–193; Gauss *et al.* this volume). The fabrics of Aeginetan pottery and their potential raw materials have been extensively characterised (Gauss and Kiriati 2011; Pentedeka *et al.* 2012, 106–115), but the extent to which the volcanic component was advantageous in producing cooking ware is more difficult to assess. As discussed above, the quantity of inclusions is especially significant, but specific contributions from different mineralogical components within the fabric need to be explored further in terms of microstructure and mechanical performance.

Pottery production on the island of Siphnos was well developed by the 18th century (AD) and it is notable for the manufacture of casseroles (Jones 1986, 861), vessels principally aimed at slow cooking in an oven. The island is located in the central Cyclades and, in contrast to Aegina, it is geologically metamorphic in character. Siphniot

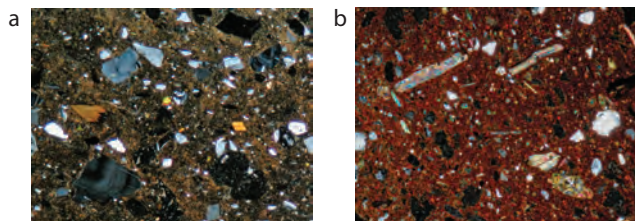


Figure 2.2. Cooking ware fabrics in thin section from (a) Aegina and (b) a Siphniot brazier, Amaroussi Athens, crossed polars, width of field is 2.75mm. Photographs I. Whitbread.

pottery were itinerant, but a widespread migration in the early 20th century also led to permanent workshops being established in several parts of the Aegean region. Siphniot potters who settled on the northern Greek island of Thasos, for example, replicated the traditions of their home island and exploited small pockets of red and yellow clay amongst the local metamorphic rocks to produce fireproof wares (Papadopoulos 1999). There is also a distinct metamorphic component in cooking pots made by Siphniot potters who settled in the Amaroussi area of Athens, with platy inclusions of muscovite mica accompanying equigranular quartz and epidote (Fig. 2.2b), not unlike the products of Pabillonis in Sardinia.

Siphniot casseroles were distributed widely throughout the Aegean and neighbouring regions. They were held in high esteem in Cyprus and when imports were banned potters at Kornos imitated the Siphniot casseroles. These imitations had thicker walls and were regarded by locals as inferior and more susceptible to thermal shock (Ionas 2000, 70). Similar problems were encountered at the pottery production centre of Kentri, Crete, which specialised in making water jars. One potter briefly produced casseroles but abandoned his efforts due to the local preference for imported Siphniot vessels (Blitzer 1984). These examples show that although Siphniot potters were able to set up workshops in several areas of the Aegean region, attempts to replicate their products were not readily accepted by consumers. Evidence of alternative sources to Aeginetan cooking pots appears in the analysis of pottery from Thorikos on the east coast of Attica. This cooking ware of the 6th to 4th centuries BC has predominantly volcanic fabrics, but the source was thought not to be Aegina based on the occurrence of metamorphic inclusions in the clay (De Paepe 1979).

The ability to expand production and exchange over long distances via sea-going transportation from the islands was probably a major factor in the widespread distribution of Aeginetan and Siphniot cooking pots. This was further enhanced by the extensive coastline of mainland Greece, permitting numerous points of access to

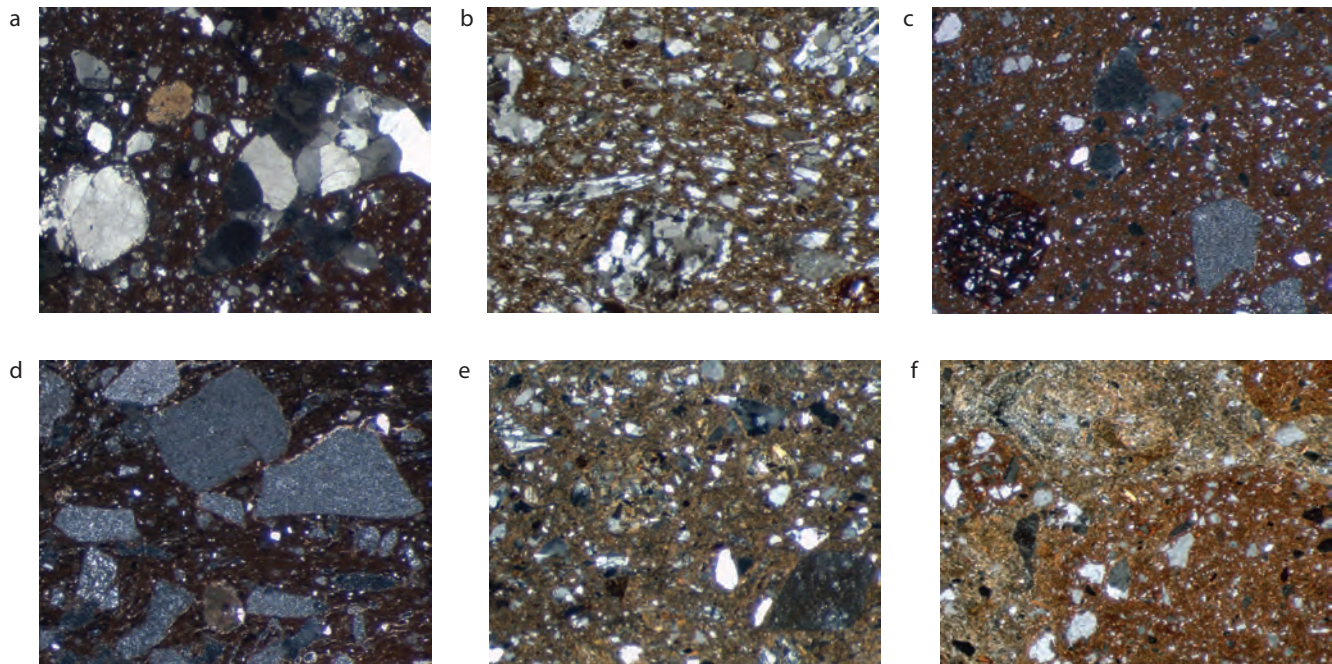


Figure 2.3. Cooking ware fabrics from the Berbati Valley in thin section, crossed polars, width of each field is 2.75mm: (a) Felsic (quartz limestone), sample 168, 11th to mid-13th century cooking pot, (b) Felsic (packed quartz), sample 247, Classical cooking pot, (c) Felsic (fine sand), sample 250, Classical cooking pot, (d) Felsic (chert limestone garnet), sample 187, Late Antique cooking pot, (e) Mudstone (quartz sand and breccia), sample 104, Archaic cooking pot, (f) Clay pellet (red silty clay pellets), sample 167, 15th century cooking pot. Photographs I. Whitbread.

communities located at some considerable distance from these sources. Transport overland was no doubt more challenging, but it should not be dismissed. Cooking pots produced at Pabillonis were distributed across the western and central area of Sardinia by carts carrying up to 100–120 four-piece sets, while women engaged in more localised exchange networks on foot, commonly carrying sets of pots over a 12–15 km radius (Annis and Geertman 1987). The distribution of cooking ware need not therefore be restricted to narrow areas of coastal contact.

The traditions represented by Aeginetan and Siphniot potters show that in different periods volcanic and metamorphic materials have both been associated with the production of widely distributed, and presumably highly regarded, cooking ware. Given the proximity of these geological terrains, the issue arises as to whether cooking pots made from similar raw materials were imported into mainland regions of Greece where sedimentary formations dominate the local geology.

Cooking pots in the Berbati Valley, Greece

The Berbati Valley is situated on the border of the

Corinthia and Argolid in the northeast Peloponnese (Fig. 2.1), approximately 15 km to the north of the Argolic Gulf and 20–25 km west of the Saronic Gulf. Actual distances of travel would have been longer depending on the routes taken, especially over the more mountainous terrain from the Saronic Gulf. The Berbati Regional Survey (Wells 1996) recovered ceramic evidence from this upland border zone that demonstrates at times intermittent occupation from the Neolithic to the Medieval and Modern periods. Identification of kiln and related production evidence in the valley dating to the Late Bronze Age, Classical, Late Antique and Modern periods led to a programme of petrographic and chemical analyses being undertaken (Whitbread et al. 2007; Whitbread 2011). A total of 243 samples were taken from pottery of all periods with selection being aimed at gaining a chronological overview of materials used for different ceramic functions, principally building, cooking, drinking, storage and transport. This was achieved by sampling, so far as possible, similar ceramic forms from different periods, such as tiles, cooking pots, cups, bowls, jars, pithoi and amphorae. These were divided into six principal fabric groups representing broad compositional differences: Calcareous sand, Felsic (quartz/feldspar), Grog, Mudstone, Sandstone and Clay Pellets. The majority of fabric groups are consistent with the local sedimentary geology

of limestone, mudstone, shale, sandstone, chert, flysch, marls and sandy marls. A small Volcanic group consists of material that was probably imported, though none of these samples come from pottery identified as cooking ware. The fabric groups were divided into 29 classes on the basis of compositional variation within the groups and technological distinctions, such as grain size and sorting.

From the wide variety of utilitarian pottery that was sampled from all periods only 13 pieces were catalogued as cooking pots in typological terms. These particular samples belong to groups and classes that are mainly felsic in character and dominated by quartz, accompanied in some cases by micritic to fine crystalline limestone: Felsic (quartz limestone), Felsic (packed quartz), Felsic (fine sand), Felsic (chert limestone garnet), Mudstone (quartz sand and breccia) and Clay Pellet (red silty clay pellets) (Fig. 2.3). In some periods pottery not identified as cooking ware also belongs to these fabric classes. Unfortunately the number of samples catalogued as cooking ware is very small and cooking ware with volcanic or metamorphic fabrics could remain undetected amongst pottery of different periods in the valley. For example, the main area of Middle Bronze Age occupation, the Mastos, was excluded from the original survey, but a subsequent study has demonstrated the presence of Aeginetan cooking ware in this location (Lindblom 2011). This evidence shows that exchange networks during the Middle Bronze Age were capable of bringing Aeginetan pottery to the valley. The occurrence of felsic fabrics in cooking ware of the Archaic, Classical, Late Roman and Late Antique periods is however beyond dispute and demonstrates that viable cooking pots did not need to be made of volcanic or metamorphic materials.

Two fabric classes in particular stand out petrographically from all of the samples analysed on account of the high quantities and sorting of their quartz inclusions. These were only found in three samples, all cooking ware, belonging to Mudstone (quartz sand and breccia) and Felsic (packed quartz) fabrics of the Archaic and Classical periods respectively. In compositional terms these quartz-rich cooking pot fabrics echo the situation in Britain as argued by Woods (1986) in that they lack the distinctive inclusions of metamorphic or volcanic origin that would be comparable to Aeginetan and Siphniot cooking ware. The distinguishing feature in all of these fabrics, however, is the relatively high density of inclusions, which is consistent with the microcrack damage zone model. It appears, therefore that potters who produced these cooking ware fabrics were aware of the advantages of using substantial quantities of inclusions. There may be performance differences between these quartz-rich fabrics and Aeginetan and Siphniot cooking ware but it is also possible that, so far as the consumers were concerned, satisfactory cooking pots could be made using sedimentary

materials, comparable to the Andean example of Araypallpa discussed above.

Further research is necessary to verify and consolidate this initial examination. This applies in particular to the Felsic (packed quartz) and Mudstone (quartz sand and breccia) fabrics found in Archaic and Classical cooking pots. From their distinctive appearance within the total dataset these fabrics perhaps offer the best opportunity to isolate “cultural recipes” for cooking ware amongst the quartz-rich fabrics represented in the analysis. A different situation appears to have emerged in the Roman and Late Antique periods. Approximately half of the samples in each case, 11/22 Roman and 18/38 Late Antique, have Felsic (chert limestone garnet) fabrics, which were used for a functionally diverse range of utilitarian pottery including food preparation (cooking pots, bowls, basins, dishes), storage (*pithoi*, jugs, jars) and transportation (amphorae). Raw material closely matching these fabrics has been found in the valley (Whitbread *et al.* 2007; Whitbread 2011), though there is little evidence of its exploitation in earlier periods. As noted above, earlier cooking ware fabrics may be distinguished by their high proportion of inclusions, but the wide range of Roman and Late Antique pottery forms produced in what might be termed a “cooking ware” fabric masks the distinctive character of cooking pots compared with other utilitarian pottery. It is possible that under these circumstances the notion of functionally specific raw materials choices for cooking pots may have been less relevant to both potters and consumers.

This discussion has sought to review some of the broader issues concerning the relationships between raw materials and cooking pot performance. In some cases these relationships were quite distinct to both potters and consumers, but numerous factors contribute to cooking ware performance, including the ways in which vessels may have been constructed, fired, seasoned and used. The one property that stands out in particular is the quantity of inclusions. Fusibility of the clay has perhaps received less attention in materials studies of traditional and ancient cooking pots (*cf.* Aronson *et al.* 1994; Picon 1992–1993; Buxeda i Garrigós *et al.* 2003) but it could help to clarify some of the distinctions made between materials of different sources and the reputations gained by particular centres for producing good quality cooking ware. The few samples of cooking ware studied from the Berbati Valley demonstrate that distinctive quartz-rich fabrics were used in parts of mainland Greece, even though the potential may have existed to acquire cooking ware made from alternative materials. These cooking pots reflect the engagement of people with materials properties and performance within wider social contexts of availability, priorities and expectations. It is hoped that future studies will expand on these results to identify production centres within the

region that may have specialised in making cooking pots with quartz-rich fabrics.

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HOME-MADE RECIPES: TRADITION AND INNOVATION IN BRONZE AGE COOKING POTS FROM AKROTIRI, THERA

Noémi S. Müller, Vassilis Kilikoglou and Peter M. Day

Introduction

Cooking pots are thought of as vessels that make rigorous demands on the durability of their materials. As a result, changes in paste technology and especially temper have often been linked to an assumed desire to increase the suitability of these specialised vessels. Various performance characteristics, such as toughness and thermal shock resistance, have been put forward in the archaeological literature to explain technological choices.¹ Although there has been criticism of purely functional approaches to technological change (Woods 1986), as well as an emphasis on the need to consider the social context of production and consumption along with non-technical factors influencing pottery manufacturing techniques (Kilikoglou *et al.* 1998, epilogue; Sillar and Tite 2000; Tite and Kilikoglou 2002), the fulfilment of performance requirements remains a popular avenue for examining technological choices in cooking ware. For example, Pierce (2005) suggests a potential improvement in performance for corrugated as opposed to plain cooking wares, while maintaining that these do not necessarily play a causal role in the shift of manufacturing practice, and Harry *et al.* (2009) argue in favour of functional reasons for technological choices in the surface treatment of otherwise seemingly unsuitable cooking vessels.

We might wish to think that the discipline has moved towards an acknowledgement of the social nature of technology (*e.g.* Pfaffenberger 1992), but there are still gaps in our knowledge of the practical principles involved in

vessel performance. While these mechanical and thermal properties are frequently employed, if not to explain then at least to examine changes in the technology of functional ceramics, the underlying mechanisms of how these changes influence physical properties are not fully understood and our knowledge is not complete (Tite *et al.* 2001). Notably, systematic studies have focused on the influence of clay type, temper and firing regime on strength and toughness (*e.g.* Feathers and Scott 1989; Hoard *et al.* 1995; Kilikoglou *et al.* 1995, 1998; Müller *et al.* 2010). Much more restricted is our understanding of thermal shock resistance, although this characteristic is drawn upon regularly to explain tempering choices in cooking ware (*e.g.* Hoard *et al.* 1995; Killebrew 1999; Broekmans *et al.* 2004). Another property deemed to be important for vessels exposed to heat, namely thermal conductivity, thus far has received little attention in the archaeological literature (Hein *et al.* 2008; Hein *et al.* this volume).

When a technological study of Bronze Age cooking ware from Akrotiri established a significant change in the manufacturing technology of the locally produced cooking ware during the Middle Cycladic (MC) and Late Cycladic (LC) periods, namely the addition of phyllite temper to an otherwise unchanged clay recipe, this raised the question of whether or not this technological development might be linked to the physical properties and potential performance of the vessels. In order to assess the impact of this change on the mechanical and thermal properties and to provide a solid basis on which to assess affordances, the influence of phyllite tempering on strength, toughness, thermal shock

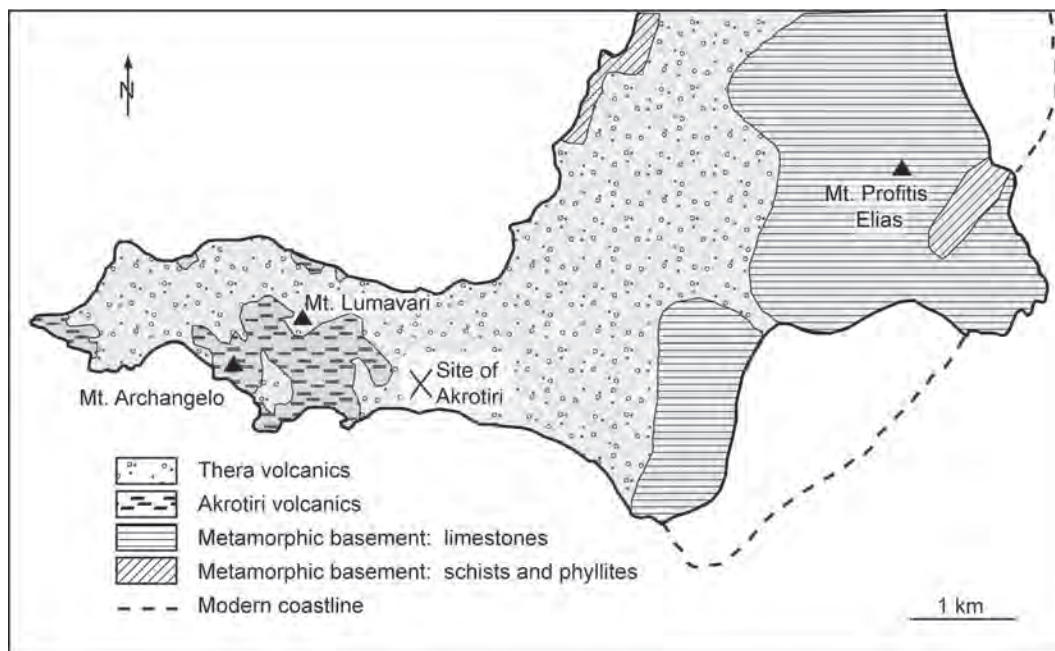


Figure 3.1. Possible palaeogeology of the southern part of pre-eruption Thera (adapted after Heiken *et al.* 1990, Nicholls 1971, and Higgins and Higgins 1996).

and thermal conductivity has been assessed systematically on experimental briquettes.

After a brief introduction to the site and the results of characterisation of the archaeological samples, the present article summarises the outcomes of mechanical and thermal tests performed on experimental briquettes, before discussing their implications for the particular archaeological case study.

Bronze Age Akrotiri

The site of Akrotiri lies on the island of Thera (or Santorini) in the South Aegean Sea and is located on the island's southern coast. Thera is the southernmost of the Cycladic islands, situated some 120 km to the north of Crete. Despite the paucity of settlement remains from the earlier occupation phases, it is thought to have been settled as early as the Late Neolithic (Sotirakopoulou 1999). By the MC period, Akrotiri appears to have developed into a major settlement; some of the later LCI buildings are built on top of, or are additions to, earlier buildings (Doulas 1983, 43; Nikolakopoulou *et al.* 2008). The last phase of occupation at Akrotiri, dated to an early phase of the Late Cycladic, LCIA, is especially well documented due to the massive volcanic eruption towards the end of the Bronze Age. The so-called Minoan eruption covered the island under thick layers of volcanic ash, thus burying and preserving the

settlement, which had developed into an urban community of considerable size.

The focus of the present paper is on cooking vessels of the MC and LC phases. In the first phase of the MC, Phase A, vessel shapes include globular vessels (at least some of which have pedestals), baking plates/pans and hearths, as well as a cooking jug with pedestal (Nikolakopoulou *et al.* 2008, fig. 32.5 h for an example from Phase B). The cooking jug, an apparently Cycladic cooking vessel, is also known from Melos, Kea and Paros (Sotirakopoulou 2008). A change in cooking ware shapes is observed with the transition to the MC Phase C, when the cooking jugs lose their pedestals and both local and imported tripod cooking vessels appear in the assemblage in significant numbers. The adoption of this Cretan cooking shape coincides with increased Minoan influence discernible at the site (Nikolakopoulou *et al.* 2008). In addition, during the last period, LCIA, it is assumed that cooking activities took place also in funnel-mouthed jars (Nikolakopoulou personal communication).

Geological setting

Santorini belongs to the South Aegean volcanic arc, and the island's geology is dominated by volcanic rocks. The ancient town of Akrotiri is built on weathered tuffs belonging to the Thera series (Pichler and Kusmaul 1980; Higgins and Higgins 1996), which are thought to

Table 3.1. Chronological phases discussed in this paper and correlation to local cooking ware fabrics at Akrotiri. The sub-divisions of the Middle Bronze Age have been established by Knappett and Nikolakopoulou (2008) and for relationship of the different phases identified at Akrotiri with Melos (Phylakopi) as well as with Cretan chronology the reader is referred to the same authors. Please note that calendar dates given are indicative only, and in particular the date of the Late Cycladic destruction is still the subject of some controversy.

	Chronological phase	Local cooking ware fabric	Absolute Chronology
Middle Bronze Age	MC Phase A	volcanic fabric, microfossils	2100–1850 BC
	MC Phase B	volcanic fabric, microfossils	1850–1800 BC
	MC Phase C (+D)	volcanic fabric, microfossils added phyllite	1800–1700 BC
Late Bronze Age	LCIA	volcanic fabric, microfossils added phyllite	until c. 1650 BC

have covered much of the island during the Bronze Age. As most of the surroundings of ancient Akrotiri are today buried under pumice from the Late Bronze Age eruption, the exact relief and geology of these volcanic rocks is unclear. The main elevated areas, Mt Profitis Elias and the Lumavari–Archangelo complex, which are not covered today, must have appeared similar before the eruption, although the metamorphic basement was probably exposed to a somewhat larger extent than it is nowadays. Also the volcanic rocks of the Akrotiri series, which can be found immediately to the west of the settlement, were just as accessible to the inhabitants of the Bronze Age settlement as they are today (Fig. 3.1).

Part I: Analyses of archaeological samples

Samples were taken from sherds and vessels representative of the spectrum of shapes as well as the macroscopically distinguishable cooking ware fabrics. In total 159 samples dating from the Final Neolithic to the Late Bronze Age were studied, 79 of which belong to the Middle and Late Cycladic periods discussed here (Müller 2009). All samples were examined by thin section petrography, to retrieve information on manufacturing technology and provenance. Further analytical methods, namely X-ray diffraction (XRD), scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FT-IR), which have been applied to selected samples, provided further information on firing regimes and composition. In the following, a very brief summary of the main results is provided, while the full analytical data will be presented elsewhere.

Thin section petrography

The analysis of the archaeological samples by thin section petrography allowed the detection and confirmation of

off-island provenance for imported ware, but also revealed variations and changes in local cooking ware technology.

The cooking ware assemblage features exclusively coarse ceramics with a high amount of non-plastic inclusions – in general more than 30% by volume. Cooking vessels appear to have been imported to Thera from off-island sites from early on. While during the Final Neolithic and Early Cycladic periods, cooking ware from a variety of Cycladic sites was consumed at Akrotiri, in the MC and LC periods, all imported vessels analysed appear to be of Naxian origin. They include a granitic fabric, which is well known from cooking vessels of the earlier periods and has been attested from the Final Neolithic and throughout the Early Cycladic in considerable amounts. The two other Naxian cooking ware fabrics, found only in samples dating to the later periods, are characterised by mica-schists.

All local cooking ware fabrics are characterised by volcanic inclusions. There are, however, changes in local manufacturing practices over time. A first change, a shift towards a somewhat more calcareous paste, characterised by the presence of sometimes abundant microfossils, occurs at the beginning of the Middle Bronze Age. The nature of the volcanic rock fragments in the coarse fraction of the cooking ware fabric in the early Middle Bronze Age is compatible with the tuffs and lavas of the Lumavari–Archangelos massif in the immediate vicinity of the site (Fig. 3.1), a notion which is further supported by the concomitant presence of microfossils, mostly foraminifera, which link it to the A₁ tuff deposits of the lower series of the Akrotiri volcanoes. It appears that a naturally coarse raw material, probably an erosion product derived of the fossil-bearing series of the Akrotiri volcanics to the west of the settlement, has been used in manufacture (see also Friedrich *et al.* 2000 for clay resources).

A second change in manufacturing technology, which is the focus of the present paper, occurs some time later, with the onset of the MC Phase C (Table 3.1). Phyllite, a cleaved metamorphic rock that results in platy temper particles, becomes an essential ingredient in the local ceramic recipe

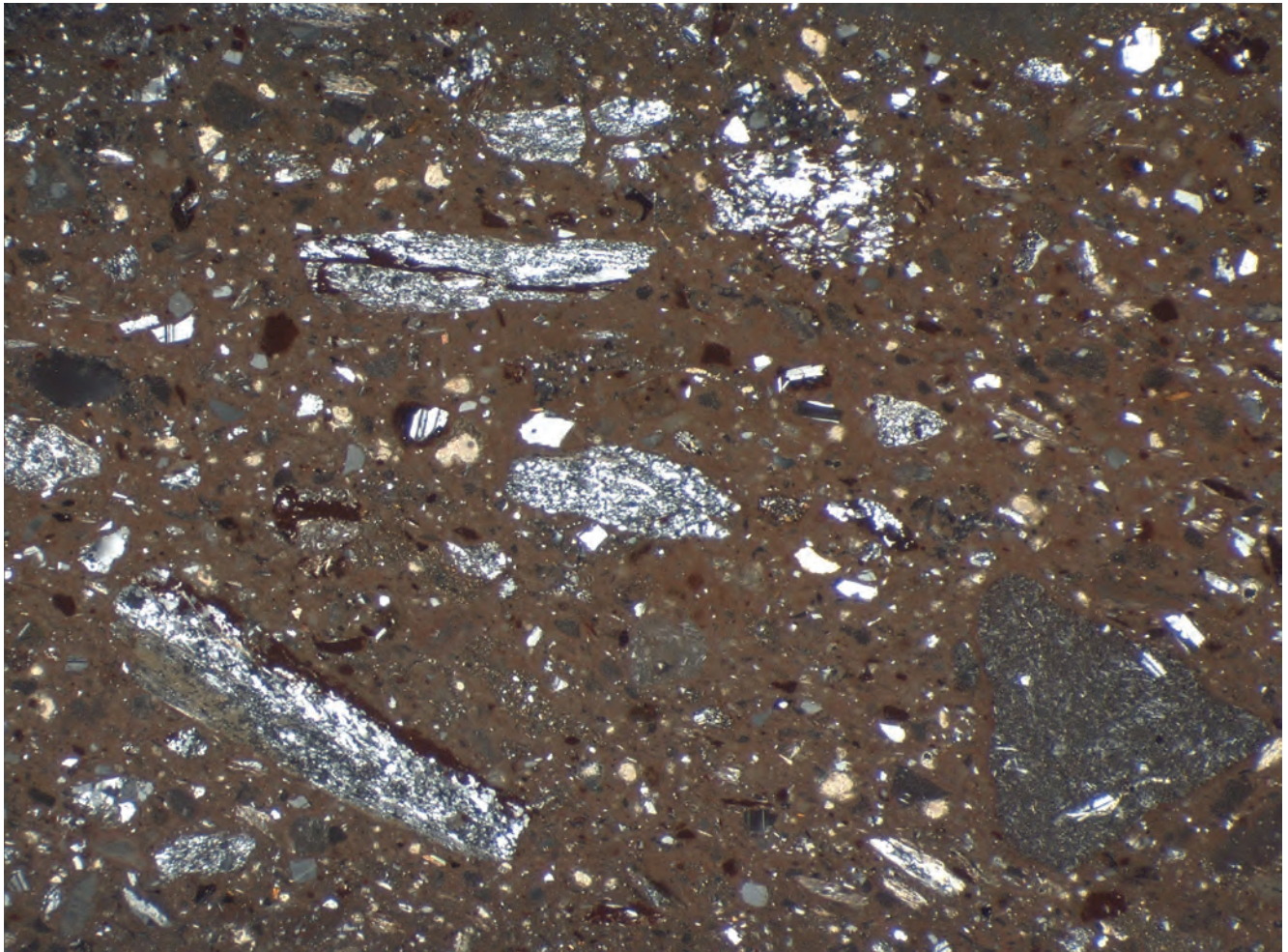


Figure 3.2. Thin section micrograph of local cooking ware fabric containing phyllite temper. Field of view: 7.4 mm.

for all cooking pots from this time onwards. The cooking ware fabric of the later MC and early LC phases at Akrotiri is characterised by volcanic rock fragments, microfossils and significant amounts of coarse phyllitic inclusions (Fig. 3.2). Apart from the additional phyllitic material, the paste appears essentially unchanged from the preceding local recipe: much as with the earlier samples, the volcanic rock fragments are accompanied by associated phenocrysts, mainly plagioclase and pyroxenes, and the tuff/pumice fragments normally are more frequent than the lava-related inclusions. Also the presence of highly varied amounts of microfossils in the groundmass is reminiscent of the earlier local fabric, as are the argillaceous and marl-like clasts present in some samples. The relative frequency of metamorphic rock fragments in the later MC and LC samples is variable, but is in all cases similar to or exceeding the amount of volcanic inclusions. Overall, the amount of non-plastic inclusions is comparable to the earlier local

fabric. There seems to be considerable variation within this group in terms of firing conditions, as reflected by the varied appearance of the samples' groundmass. If we disregard the metamorphic component, the ceramic recipe seems to be identical to what has been employed earlier, and therefore most likely represents continuing use of sources immediately to the west of the settlement.² The phyllitic constituents are assumed to derive from the area around Mt Profitis Elias to the east of Akrotiri, where low grade schists and phyllites are exposed even today in ravines around the mountain and on the Sellada Pass (Davis and Bastas 1978; Pichler and Kussmaul 1980). Their presence in all samples implies that raw materials from different locations were brought together in the production of cooking vessels in the Late Middle and Early Late Cycladic periods. While metamorphic material is occasionally observed in the volcanic base clay, the presence of phyllite particles in this fabric is on a very different scale, both

in terms of frequency and size of particles, and clearly reflects the intentional admixture of a different material from a distinct source, as has been suggested previously (Einfalt 1978). The significance and possible incentives of this change in cooking ware manufacturing techniques, which seems to have been implemented on a general level by the MC Phase C, is the subject of this paper.

Additional analyses

Additional analyses by SEM, XRD and FT-IR on later MC and LC cooking ware were carried out on samples with a glassy appearance of the groundmass under the polarising microscope. They revealed extensive vitrification of the clay matrix, complete breakdown of all clay minerals, including illite, and neo-formation of anorthite, thus suggesting rigorous firing, equivalent to exposure to temperatures in the range of 1000–1050°C for c. 1h. For samples with a birefringent micromass, corresponding to no vitrification of the clay matrix, XRD and FT-IR analyses suggest firing equivalent to exposure to temperatures lower than 800°C for 1h.

Part II: Mechanical and thermal properties

Strength, toughness and thermal shock resistance are the performance properties used most often in the archaeological literature to assess the suitability of a ceramic to perform use-related functions (Tite *et al.* 2001). Additionally, “heating effectiveness” has been introduced, in order to quantify heat transfer in cooking vessels (Skibo *et al.* 1989; Schiffer 1990). The present study assesses fracture strength, toughness, thermal shock resistance and thermal conductivity, the concept of “heating effectiveness” being difficult to rationalise (see Hein *et al.* 2008), as all of these can be considered relevant for cooking vessels. *Strength* determines the amount of force which can be applied to a material until a crack initiates. It is related to the ability of a material to withstand static stresses. It is important to recognise that the initiation of a crack is not necessarily equivalent to whole vessel failure and therefore does not necessarily imply that a vessel cannot be used any longer. *Toughness*, which is a measure of crack initiation and propagation, is the property connected to the structural integrity of a vessel. For coarse cooking ware fabrics it can be argued that toughness is more important than strength, since the high flaw population introduced by high amounts of large aplastics results in a relatively weak material. While strength should be sufficient for a vessel to be of practical use, high toughness can be argued to be of greater

importance. *Thermal shock resistance* describes a material’s ability to withstand sudden changes in temperature. It is not a material property like strength and toughness, but a complex parameter, which is dependent also on the nature of thermal shock. *Thermal conductivity* is a measure for heat transfer in a material. High thermal conductivity is important for an even distribution of heat in a cooking pot, so as to avoid the emergence of hot-spots, where food can easily be burnt, but the property also influences the time required to heat up food (Hein *et al.* this volume). While thermal conductivity can be said to affect the cooking process, therefore, the first three properties are important for a vessel’s survival and connected to its service-life. It should be noted that, in the case of relatively slow heat transfer, thermal conductivity also plays a role in the thermal shock behaviour of brittle ceramics (Hasselman 1969), with higher thermal conductivity resulting in a greater thermal stress resistance parameter. For very sudden changes in temperature, such as in quenching experiments which are usually employed to assess thermal shock (worst case scenario), however, it is assumed that heat transfer is ineffective and thermal shock behaviour is independent of thermal conductivity.

Experimental

In order to assess the influence of phyllite temper systematically, experimental briquettes were prepared with various amounts of phyllite temper added to both calcareous and non-calcareous base-clays and fired to a range of temperatures. Test specimens were fabricated with a calcareous (c. 14% CaO) clay from Pikermi (Attiki, Greece) and a non-calcareous (<0.5 % CaO) base clay from Kalami, Greece. The elemental composition of the clay fraction with particle size <30 µm has been determined by energy dispersive X-ray analysis on polished sections of fired briquettes.³ Phyllite from Argos, Greece was gently crushed and sieved and the 0.5 to 1 mm fraction was added to calcareous clay from Pikermi and a non-calcareous clay from Kalami. In addition to untempered test briquettes, briquettes containing 10% and 40% of temper material were prepared and fired for 1h to 550°C, 850°C and 1050°C in an oxidising atmosphere. These temperatures were chosen since they were expected to lead to different microstructures: 550°C is well below and 850°C is around the onset of vitrification, while 1050°C usually results in extensive vitrification of the clay matrix. It must be emphasised that, for a ceramic’s mechanical and thermal properties, it is the microstructure achieved by a certain firing regime, rather than firing temperatures per se, which is of relevance. For the archaeological samples on which the experimental study is based, highly vitrified, initially

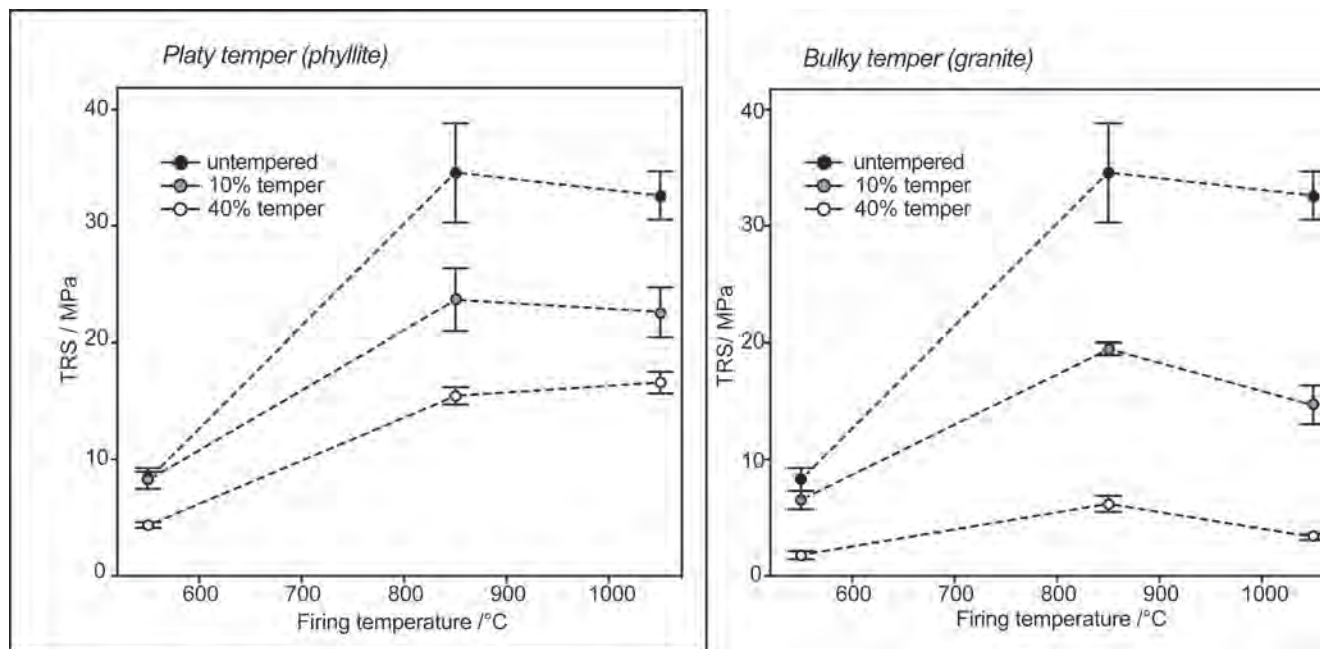


Figure 3.3. Transverse fracture strength as determined on three-point bending tests (Müller *et al.* 2010).

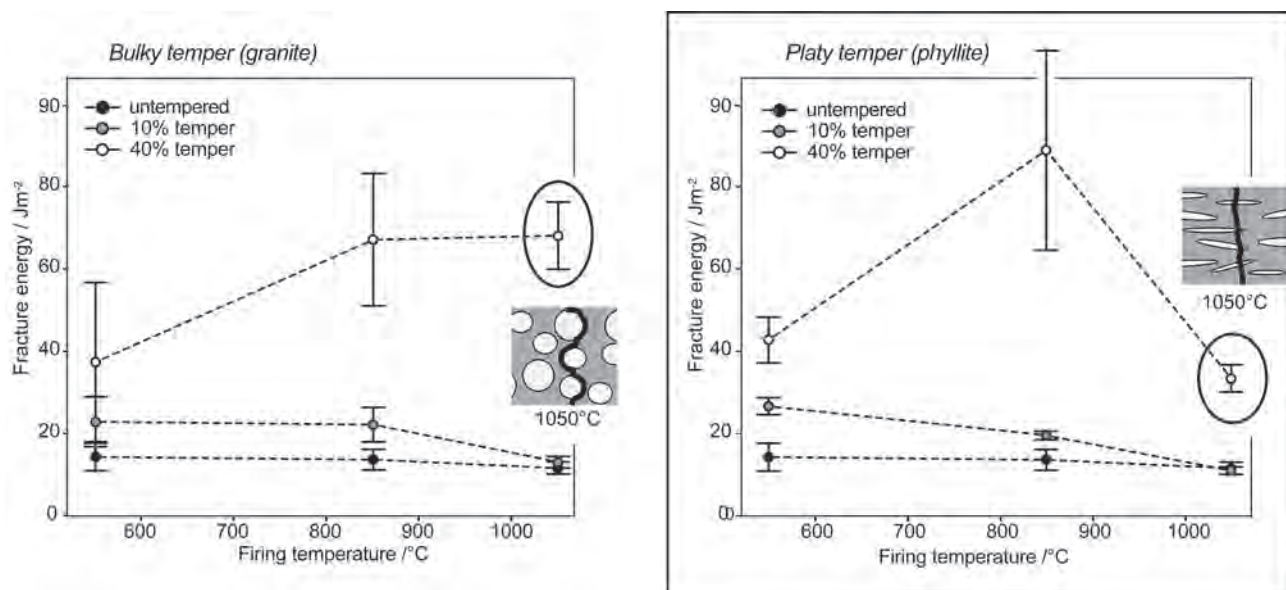


Figure 3.4. Fracture energies as determined on four-point bending tests (Müller *et al.* 2010).

vitrified and non-vitrified microstructures have all been observed. For briquette manufacture the paste was folded repeatedly and flattened, so as to achieve orientation of the platy temper material parallel to the largest surface of the briquette. All tests have been performed vertical to the longest axes of the phyllite particles, so as to simulate common archaeological fabrics. Preparation and

characterisation of the raw materials used are described in depth elsewhere, as are the test methods employed, and the reader is referred to the relevant literature for further detail (Hein *et al.* 2008; Müller *et al.* 2010; Müller *et al.* 2014). The present article focuses on the effect of phyllite temper on mechanical and thermal properties. In view of the granitic ware which appears to have been

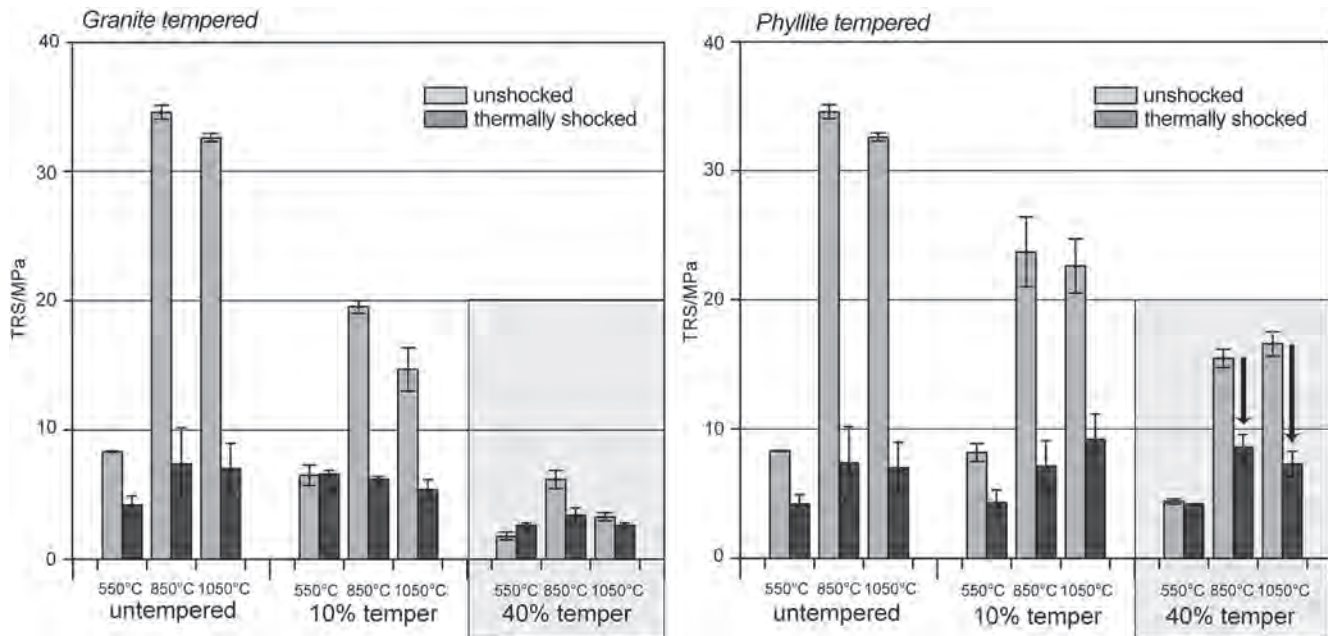


Figure 3.5. Comparison of TRS of experimental briquettes before and after thermal shocking.

imported to Akrotiri in significant numbers and over a long stretch of time, we have also assessed the impact of granite tempering (*ibid.*). The latter, however, will not be discussed in detail here.

Results

Fracture strength

Transverse rupture strength (TRS) or modulus of rupture in bending (MOR) has been determined from three-point bending tests on bars of c. $1 \times 1 \times 7$ cm (Kilikoglou *et al.* 1995). For every ceramic type (corresponding to one set of parameters) TRS was measured on five bars. Data from bars with clearly identifiable macroscopic flaws in the fracture surface were not included in the determination of the mean. TRS was calculated according to standard methods (BSI 2002).

The addition of phyllite temper reduces fracture strength for all firing temperatures. This is shown in Fig. 3.3 for a calcareous base clay, but is observed equally with non-calcareous clays (Müller *et al.* 2015). This behaviour is expected, since fracture strength depends crucially on the amount of flaws in a material, such as pores or microcracks. Tempering introduces such flaws to a ceramic. As shown in Fig. 3.3, for the same amount of temper added, the reduction in strength is less pronounced in phyllite-tempered material than in the corresponding granite-

tempered briquettes. This can be explained considering that phyllite temper introduces fewer flaws in a material, due to its shape. So phyllite tempering results in a smaller area of the so-called damaged zone around temper particles, when compared to the same volume fraction of a more spherical temper. It also induces less macro porosity in bodies with a higher non-plastic percentage (Müller *et al.* 2010). For the same base clay, at the same firing temperatures and same temper amounts, adding phyllite temper can therefore be considered less detrimental to the strength of a ceramic than adding a temper with higher sphericity, such as granite.

Fracture toughness

Fracture energies were determined from four-point bending tests on pre-notched bars of an approximate size of $1 \times 1 \times 7$ cm, with a notch depth of 1 mm. For every ceramic type (corresponding to one set of parameters) three bars were tested. The results of the very few test bars where breakage would not originate from the notch but from pre-existing macroscopic flaws were not included in the determination of the mean values. Intrinsic fracture energy G_i and toughening component G_t were calculated as described in the literature (Kilikoglou *et al.* 1995).

High toughness levels can be reached by adding large amounts of temper, shown in Fig. 3.4 for a calcareous base clay. This has been observed in earlier experiments for quartz temper (Kilikoglou *et al.* 1998), as well as in

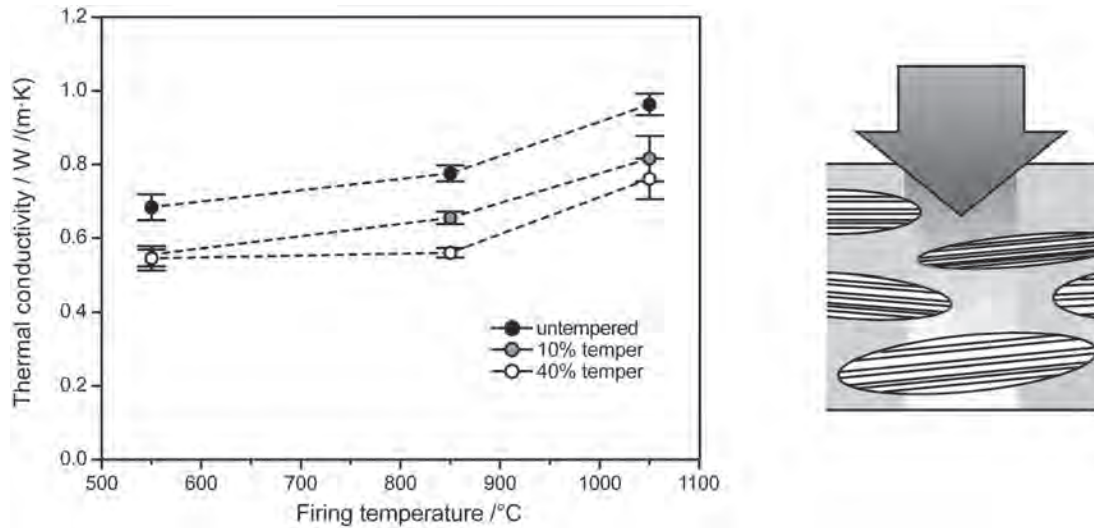


Figure 3.6. Thermal conductivity of phyllite-tempered briquettes (measured at 164°C).

comparative ceramics based on non-calcareous clays (Müller *et al.* 2015). In coarse ceramics which show stable fracture, high toughness is governed mainly by the ability of a material to dissipate energy during crack propagation. For energy dissipation, pre-existing flaws are beneficial, as they provide the material with additional means to absorb energy during crack propagation and allow a crack to be arrested before it leads to vessel failure. Conversely to its influence on fracture *strength*, tempering is therefore usually considered as beneficial for the *toughness* of a ceramic.

In terms of the influence of temper shape on toughness, the results of the experiments indicate that it is not great at lower firing temperatures. In high fired ceramics, however, toughness is reduced in phyllite-tempered material, both compared to lower fired and to comparative granite-tempered ceramics. Unlike in the granite-tempered ceramics, cracks in high fired phyllitic fabrics often propagate through the phyllite particles, breaking the thin plates in half and eliminating any contribution they may have had on toughening. Weakening of phyllite temper at high firing temperatures and increased bonding with the matrix are suspected to contribute to this effect.

Thermal shock resistance

The thermal shock resistance of ceramics is governed by their fracture mode (Müller *et al.* 2014). Brittle ceramics behave differently from ceramics that show stable fracture. Brittle ceramics experience an abrupt loss of strength at a critical temperature difference, due to the initiation of fracture, while the loss of strength is more gradual

in ceramics with stable fracture, due to more controlled crack propagation. With ceramic materials, brittle fracture is typical for porcelain while stable fracture is usually associated with coarse earthenware. Consequently, the strategy for optimising thermal shock resistance in highly tempered clay-based ceramics that show stable fracture is different from the one for a brittle material, as it involves avoiding crack propagation rather than crack initiation. For highly tempered ceramics such as the Bronze Age cooking vessels of Akrotiri, therefore, we can assume that a material which is better able to absorb energy during crack propagation will be better able to withstand thermal stress.

In experiments, the influence of phyllite tempering on thermal shock resistance was determined on the experimental briquettes as reduction in TRS upon thermal shocking. The determination of TRS is described in the above paragraph on fracture strength. Briquettes were exposed to five cycles of thermal shock, achieved by quenching pre-heated briquettes from 430°C to 30°C.

The addition of temper material generally results in an increase in thermal shock resistance; the more temper added, the lower is the measured reduction in strength levels (Fig. 3.5). It is found, in particular for highly tempered material, that strength reduction upon thermal shocking is more pronounced for phyllite-tempered ceramics as compared to granite-tempered material. This is shown in Fig. 3.5 for a calcareous base clay, but the same is observed for a non-calcareous base clay (Müller *et al.* 2014). As discussed above, phyllite temper, due to its shape, introduces fewer flaws in a ceramic than the same volume fraction of a more spherical temper. This results in a material less able to accommodate tensions arising from

differing thermal expansion, and more prone to experience strength decrease upon exposure to thermal stress.

It should be noted that although the phyllite-tempered ceramics have a lower thermal shock resistance, their residual strength after thermal shock is still higher than the ceramic bars tempered with granite, for the experimental parameters chosen. While important, absolute strength levels after thermal shocking are also dependent on the experimental parameters, making it difficult to transfer the particular experimental data to an archaeological case study, and are thus not usually taken into account. Instead, the stability of strength levels under conditions of thermal shock, which are a measure of the impact of thermal shocking on a material's structural integrity, is usually examined. In this regard, the results of the experimental study show that for high amounts of temper and for higher firing temperatures, adding bulky granitic temper results in a ceramic material that experiences no, or only negligible, structural damage upon thermal shocking. This is opposed to the behaviour of ceramics containing platy phyllitic temper, which experience a significant strength loss upon thermal shocking.

Thermal conductivity

Thermal conductivity has been determined with a modified Lees' disk setup as described in Hein *et al.* (2008). Phyllite tempering reduces the thermal conductivity of a ceramic material. This is illustrated in Fig. 3.6 for various amounts of phyllite temper added to a calcareous base clay and fired to different temperatures. Phyllite inclusions consist of layered sheet silicates interspersed with bands of equant minerals, mainly quartz. The observed reduction in thermal conductivity is due mainly to the very poor thermal conductivity of sheet silicates, such as micas, perpendicular to the heat flow. In archaeological ceramics, due to manufacture, platy temper particles are usually found to be aligned parallel to a vessel wall, maximising the negative effect of phyllite inclusions on heat transfer, as indicated in the schematic drawing in Fig. 3.6.

In contrast to the negative effect of phyllite tempering on thermal conductivities, granite temper, at least at lower firing temperatures when the effect is not obscured by increased manufactured porosity introduced by the angular temper particles, has been observed to increase the thermal conductivity of a ceramic, an effect which is due to the relatively high thermal conductivity of the temper material (Hein *et al.* 2008).

Discussion and implications

The cooking wares of Bronze Age Akrotiri contain a high

volume fraction of aplastic inclusions, as in fact do many archaeological cooking vessels. While highly tempered ceramics generally have rather low strength levels, they normally show stable fracture and are efficient in the dissipation of energy during crack propagation (Kilikoglou *et al.* 1995). For those ceramics, therefore, rather than avoiding crack initiation, it is the avoidance of crack propagation which is important. It seems as if the addition of phyllite temper to an otherwise unchanged clay paste – effectively replacing some of the more bulky volcanic inclusions – would increase strength and decrease toughness, especially in the higher fired samples. We should note here that, in the latest chronological phases covered by the study, the Middle and Late Bronze Age phases, high firing temperatures are actually observed in a number of archaeological samples. Further, phyllite tempering is not expected to be beneficial for thermal shock resistance of the ceramics, since phyllite-tempered ceramics have been observed to experience structural damage upon thermal shocking, an effect which can be associated with the temper shape. Concerning heat transfer, phyllite temper, when aligned perpendicular to the heat flow, has been observed to reduce a ceramic's thermal conductivity. Since the thermal conductivity of volcanic rocks, with the exception perhaps of very porous tuffaceous fragments, is much higher than the conductivity of phyllitic particles perpendicular to sheet silicate layers, introducing phyllite temper is expected, if not to lower, then certainly not to increase the thermal conductivity of the ceramic material. Therefore, on a number of grounds, it appears that the addition of phyllite to Thera cooking ware led to a reduced theoretical suitability of the ceramic material.

It is important to keep in mind, however, that differences in material properties cannot be translated directly to differences in performance of the actual vessels. Amongst other factors, a vessel's performance also depends on the magnitude and nature of the mechanical and thermal stresses it is exposed to – factors which can be taken into account by computer modelling, as can the effect of vessel shape. Furthermore, the impact of differences in material properties on the actual durability of a vessel can be alleviated by careful handling. Based on our knowledge of material properties, therefore, we cannot judge directly the magnitude of quality loss, nor can we determine whether this quality loss was perceivable or perceived by people in antiquity. Finally, material analyses conducted within the present study were restricted to performance properties relevant to the *finished* vessels. However, also the performance a ceramic material exhibits *during* manufacture (such as shrinkage or workability) can be a decisive factor for or against its selection.

Bearing these limitations in mind, the results presented

here nevertheless suggest that in the present case, the introduction of phyllite tempering did not increase the performance properties thought relevant for cooking ware. Importantly, therefore, the analytical results do not allow us to connect the introduction of phyllite tempering at Akrotiri with a better performance of the resulting cooking vessels, and, in our case, potters' technological choices cannot be argued to have been connected to an increased suitability of the vessels.⁴

Thera has a predominantly volcanic geology. Although phyllite outcrops were probably accessible around Mt Profitis Elias and it could be assumed that erosion products might have been transported further downhill, it appears unlikely that this rock type would have been found in the immediate vicinity of the site (Fig. 3.1). Phyllitic rocks were perhaps also exposed at locations in the pre-eruption caldera. The introduction of this particular new tempering agent appears, therefore, contrary to reason, in terms of the material's affordances for performance and efficiency, as it involves the investment of additional effort for the production of what could be argued to have been a worse-quality cooking ware.

A hint as to what could have triggered this at first sight irrational adoption of a new tempering practice at Akrotiri might be provided when we examine further its context. The change in manufacturing practice coincides with the introduction of a new shape into the local assemblage – that of the tripod-legged cooking pot – but also with the introduction of the potter's wheel for the manufacture of certain shapes (Knappett and Nikolakopoulou 2008). The tripod cooking pot is a typically Cretan shape. On Crete, tripod cooking pots are found in large quantities throughout the Middle and Late Minoan periods (Betancourt 1980; see also Haggis and Mook 1993), while early examples are known from Early Minoan II levels (Warren 1972, 124). On Crete, phyllite- and schist-based fabrics are used widely in the production of cooking vessels and the recipe is believed to be part of pottery-making traditions since it is found almost irrespective of provenance (Day 1991; Betancourt and Myer 1995; Day *et al.* 1997). It could be suspected, therefore, that it is not only a new shape which appears to derive from Crete, but also the practice of phyllite tempering. In fact, the change in tempering practice at Akrotiri affects all locally produced cooking vessels, including the “Cycladic” cooking jugs, a shape which continues from earlier periods. Finally, while there are Cretan imports in non-cooking ware, no Cretan cooking vessels have been found at Akrotiri in the Middle and Late Bronze Age.

Cretan influence in the Cyclades was on the rise during the Middle Bronze Age. Minoanising traits appear at various Cycladic sites (Broodbank 2004) and include increased amounts of imported Minoan ware and the emergence

of local “minoanising” pottery, a phenomenon which is explained either as the result of strengthening economic ties, or of the exertion of political control by Crete. At Akrotiri, it is in MC Phase C that Minoan imports are found in greater numbers and that potters are thought to become receptive to Minoan influences. Rather than indicating the establishment of a Minoan colony, it has been proposed that Akrotiri actively chose to become more engaged in South Aegean networks at the time, and that it was the local population's response to novel forms of material culture which led to a gradual cultural *colonisation* of the community (Knappett and Nikolakopoulou 2008). The observation, however, that in the local production of cooking ware not only Cretan shapes but apparently also Cretan technology was adopted, suggests a transmission of clay body preparation practices, beyond mere emulation by local potters.

Conclusion

At a time when Thera appears to be entering the sphere of influence of Minoan Crete, the introduction of not only a new shape, but also of a novel recipe for the ceramic body of cooking vessels, which appears unconnected to their performance, could imply more far-reaching transformations of craft practice at Akrotiri during the MC period. Taking into account that cooking ware is found to be especially resilient to technological change and recipes have been revealed as crucial to the identity of certain craft groups (Day 2004), it is worth considering whether off-island craftspeople played an active role in the implementation of change in manufacturing practice at Akrotiri. The findings we report here should be considered alongside Knappett and Nikolakopoulou's important observations (2008, 37–39) and might just suggest the presence of Cretan potters at Akrotiri during the later part of the MC period and the LC. In this ceramic study while the cooking pot clay recipes may be tantalising, it is worth considering where “home” was for those who made them.

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Notes

- 1 For early examples see Braun 1983; Steponaitis 1984; Bronitsky and Hamer 1986; Feathers and Scott 1989.
- 2 The two local cooking ware fabrics discussed here appear compatible with what Jill Hilditch describes in her technological study of the MCB and MCC ceramic assemblage at Akrotiri as “Fabric group A: local calcareous ceramics, coarse” and “Fabric group A, metamorphic-rich subgroup” respectively (Hilditch 2008).
- 3 For more information on the composition of the clays employed the reader is referred to Kilikoglou *et al.* 1998; Kilikoglou *et al.* 1995, and to Hein *et al.* 2008, respectively.
- 4 The observation that the addition of phyllite temper is not beneficial for the performance of the cooking ware produced at Akrotiri does not negate the possibility that the addition of this type of temper improved the performance of cooking ware elsewhere. Phyllite temper is, for example, expected to increase the suitability of a vessel to be used as a cooking pot when added to relatively fine clay which is fired to low firing temperatures.

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HEATING EFFICIENCY OF ARCHAEOLOGICAL COOKING VESSELS: COMPUTER MODELS AND SIMULATIONS OF HEAT TRANSFER

Anno Hein, Noémi S. Müller and Vassilis Kilikoglou

Studies of archaeological cooking vessels reveal a large variety of shapes, and different methods of clay paste preparation that may have been used in their production. The influence of both material and shape on properties such as strength and toughness, but also on thermal shock resistance, has received considerable attention in the archaeological literature. Heat transfer processes, however, are also important when examining vessels used for cooking. A first approach towards examining the heat transfer in cooking pots was the study of so-called “heating effectiveness”. Here, the performance of replicas of archaeological cooking pots was examined under controlled conditions, and the rate with which the temperature of the pot’s content was raised was determined. This paper presents a novel approach to quantify the heating efficiency of archaeological ceramics in a more systematic way, using computer modelling. Based on typical vessel shapes and material data, digital models of cooking vessels are developed and investigated with the finite element method (FEM). The present approach allows for the evaluation of heating efficiency and the assessment of particular parameters and variation therein.

Introduction

Archaeological cooking vessels come in a large variety of shapes and different methods of clay paste preparation may have been used in their production. Potters’ choices in manufacture, such as the base clay (or base clays, in the case of mixing), non-plastic inclusions, either added as temper or present in raw clays, and the firing

conditions affect material-related parameters including composition, microstructure and porosity. Shape-related parameters include wall thickness, diameter, curvature and height. All these parameters are known to affect the performance of ceramic vessels. In order to be able to tackle questions related to issues such as raw material choice and vessel suitability, it is of importance to know how these parameters influence the performance of a cooking vessel, and which performance characteristics are affected when varying selected parameters.

Many technological studies of archaeological ancient ceramic vessels restrict considerations to the examination of the *ceramic material*, usually focusing on mechanical properties such as strength and toughness or on thermal shock resistance (see *e.g.* Tite *et al.* 2001 for an overview). More recently, the introduction of computer-based simulation has promised the possibility of including shape-related parameters in such considerations (Kilikoglou and Vekinis 2002; Hein *et al.* 2008a).

Heat transfer, which is an essential process for cooking applications, in many cases has been neglected at the expense of a preoccupation with thermal shock resistance. A first approach towards examining the heat transfer in cooking pots was the study of what has variously been termed “heating effectiveness” (Skibo *et al.* 1989; Schiffer 1990), “heating rate” (Young and Stone 1990) or, in a more recent publication, “cooking effectiveness” (Pierce 2005). One of the main proponents of the approach (Schiffer 2003) stresses the importance of keeping material properties as well as formal properties (*e.g.* shape), which are both influenced by choices in manufacture, distinct from performance characteristics such as “heating

effectiveness”, which encompass the interaction of the artefact with people and with other artefacts and as such can be defined as activity-specific behavioural capability.

For determining “heating effectiveness”, replicas of archaeological cooking pots are subjected to heating experiments under controlled conditions and the rate at which the temperature of the pot’s content is raised by the application of an external heat source is determined. Heating effectiveness is, however, a rather complex parameter, depending on thermal conductivity, heat capacity, permeability and vessel shape as well as on external constraints. The above experiments were largely restricted to an assessment of the influence of shape on heating rate, leaving other parameters constant in a bid to eliminate their influence. Nevertheless, it should be noted that such experimentally determined “heating effectiveness” is difficult to interpret without a thorough examination of the underlying relations and interactions, such as for example between manufacturing choices and microstructure, microstructure and material properties, and material properties and “heating effectiveness”.

The firing conditions, for example, greatly affect the resulting ceramic microstructure, and differences in microstructure affect thermal conductivity, a physical property that plays a major role in the heating rate of a vessel. Apart from the firing conditions, the ceramic microstructure depends also on the clay type used. The heating rate, however, cannot be linked to thermal conductivity in a linear way, since it is affected also by other material properties, such as permeability, shape and external constraints. In order to understand how the firing of a vessel in manufacture affects its heating rate in use, it is therefore of paramount importance to examine not only how firing affects the microstructure of a ceramic and its thermal properties, but also how other properties then influence the heating rate. Computer modelling using the finite element approach is uniquely suited to overcome these difficulties and to quantify the heating efficiency of archaeological ceramics in a more systematic way, as will be described below. This novel approach is presented in the following sections: based on typical vessel shapes and material data, collected in a recent study on the material properties of typical clay-based ceramic fabrics (Hein *et al.* 2008b), such as have been used for prehistoric cooking pots, digital models of cooking vessels are developed and investigated with the finite element method. More specifically, a model of a cooking pot and content is exposed to simulated heat loads and the temperature development and heat flux in the entire system is determined. The method allows for straightforward estimation of the heating efficiency. The advantage of the simulation approach is that models of any cooking pot can be tested, in terms of ceramic fabric or shape. Furthermore, the

constraints of the cooking process, such as the temperature of the heat source, the temperature of the environment and the properties of the content, can be freely selected and varied. Most importantly, and in contrast to the experiments on “heating effectiveness” described above, the influence of selected parameters on heating rates and energy transfer can be effortlessly and unambiguously singled out, allowing for a more systematic study. The finite element approach allows thus for the evaluation of heating efficiency and the assessment of the influence of particular parameters and variation therein, such as shape as well as material properties, in a straightforward way. Furthermore, different kinds of cooking processes can be simulated, allowing for the assessment of specific vessel types in terms of their use. This paper aims to present the potential of the finite element approach for the assessment of heating efficiency using the example of heating water in cooking pots with differently shaped bases.

“Heating efficiency” versus “heating effectiveness”

A central aim of the study was to define a straightforward parameter for assessing the performance of cooking vessels in relation both to material parameters, such as clay type, firing conditions and non-plastic inclusions, and to vessel shape. The “heating effectiveness”, introduced by Schiffer some 20 years ago and defined as the rate at which the temperature of the pot’s content is raised by the application of an external heat source (Schiffer 1990, 374), is the product of a combination of many parameters as well as external constraints, which, when not carefully controlled and recorded, do not allow conclusions on the influence of specific material parameters.

The finite element approach is uniquely suited to overcoming these difficulties, as it allows us to selectively evaluate the influence of parameters of interest on heating rates and energy transfer (be these parameters material- or shape-related, or in fact external constraints), thus excluding experimental uncertainties. This method allows for a straightforward estimation of the *heating efficiency* η , which is the ratio of the heating energy absorbed by the content E_{content} and the heating energy Q_{heat} which is applied to the cooking pot:

$$\eta = \frac{E_{\text{content}}}{Q_{\text{heat}}}$$

Only E_{content} is available for the actual cooking processes (*i.e.* during the heating-up phase and during the phase of maintaining the temperature). On the other hand a part of the total heating energy Q_{loss} is emitted into the environment, mainly by thermal convection between the

vessel's surface and the ambient air or between the vessel's content and the air. Another part of the total heating energy E_{vessel} is absorbed and stored by the cooking vessel (Fig. 4.1). This, however, applies in the first instance to the heating-up phase. Therefore, in the heating-up phase the total heating energy Q_{heat} can be expressed as:

$$Q_{\text{heat}} = E_{\text{content}} + E_{\text{vessel}} + Q_{\text{loss}}$$

E_{vessel} does not contribute to the cooking process as long as energy is being added to the system; however, as soon as a vessel is removed from the heat source the energy stored in the vessel eventually supports the process by helping to maintain the contents' temperature and slow down cooling. In order to increase the heating efficiency of the vessel the heat loss Q_{loss} has to be minimised. This can be achieved through control of the thermal properties of the ceramic material, through the vessel shape and through control of the environmental constraints. Furthermore, if we consider only the process of heating up the contents with a constant energy supply from a heat source, a lower E_{vessel} will also result in an increase in heating efficiency. E_{vessel} depends on the heat capacity and the mass of a vessel. Ceramic vessels in general have comparatively higher heat capacities and accordingly higher E_{vessel} (at constant vessel mass) than most metal pots. As a consequence, regarding the heating-up phase, a metal cooking pot will have a higher heating efficiency than a ceramic vessel. However, things are slightly more complex, since once a vessel is removed from a heat source, the energy stored in the vessel will also contribute to heat transfer processes, giving rise to the observation that ceramic cooking vessels keep their contents warm for much longer than metal ones. Finally, different cooking methods may require vessels with different heat transfer properties, demonstrated for example in an ethnographic case study about the parallel use of metal and ceramic pots (Skibo 1992, 29).

The overall heating efficiency η_{total} , which is the sum of the heating efficiency for heating up the contents of a vessel $\eta_{\text{heating up}}$, and the efficiency of maintaining cooking temperature $\eta_{\text{maintaining}}$, affects the duration of cooking foodstuffs. It also affects the amount of fuel consumed both during heating up and while maintaining cooking temperatures. The heating efficiency for heating up corresponds to the parameter Schiffer investigated in order to assess the "heating effectiveness" of a vessel, and it is $\eta_{\text{heating up}}$ that will be investigated with the finite element approach in the following section.

Approach

Heating efficiency was tested in a simulation approach using the finite element method (FEM). This is a numerical

method for solving complex physical problems, such as evaluating the performance of objects or structures under simulated loads and under defined constraints. In general FEM can be applied to all kinds of physical problems, which can be described by partial differential equations as subject to time and space. The region of interest, such as in the present case the digital model of a cooking pot, is divided into an arbitrary number of sub-regions, the so-called elements. In this way the continuous structure is mapped on a discrete mesh. Each element consists of a group of nodes connected to each other. For each of these nodes basis functions are defined concerning the degrees of freedom (DOF) to be examined (Hughes 2000). In the present case these are temperature and heat flux. Because the elements are linked to each other via common nodes, a system of equations is formed describing the inner system in equilibrium, with regard to its state at the nodes. In addition to the coordinates of the nodes and the initial values of the DOFs, the relevant material properties also have to be defined. In the present case these are heat conductivity, specific heat capacity and density. The system can be solved either in steady state, i.e. having reached equilibrium, or with a transient solution, investigating for example the temperature development over time.

Following the original approach for the assessment of "thermal effectiveness" the heating of one litre of water from 25°C to 100°C was simulated. The feasibility of the simulation approach was tested with two-dimensional models of different cooking vessel shapes. The models so far focus on the heat transfer between heat source and water and the heat loss from the surface of the cooking pot and from the water surface into the environment, neglecting for example thermodynamic effects of phase transitions. In a first test two basic vessel shapes were examined: a cooking pot of globular shape and a cooking pot of cylindrical shape, the latter representing vessel shapes with a flat base (Fig. 4.2). For both vessels a wall thickness of 1 cm was assumed. The cooking pot models were assumed to be heated by a circular heat source with a diameter of 50 mm. In the two-dimensional model the heat source corresponded to a section of the outer surface of the vessel base, with a horizontal extension of 50 mm. The temperature of the heat source was presumed to be 450°C, introduced homogeneously into the base of the cooking pot. (This results in an abrupt and sharp change in temperature where the outer vessel surfaces rise over the heat source. While in reality a more smooth transition in temperature would be expected, in terms of assessing thermal efficiency, i.e. energy transfer, this results in an error which is negligible.) The heat transfer between ceramic and water was assumed as thermal convection presuming moderate stirring. Accordingly, a film coefficient of 200 W/(m²K) was used in the calculations,

describing the convective heat transfer from a solid surface into slowly flowing water with a different temperature. The ambient temperature was presumed at 25°C. In the present model a density of 1500 kg/m³ and a heat capacity of 900

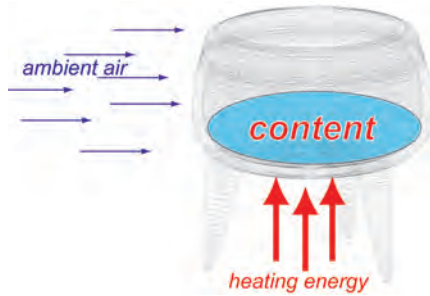


Figure 4.1. Model of a cooking process. The cooking pot and its content is heated by a heat source from below. At the same time heat is lost by heat flux into the environment, mainly through thermal convection.

J/(kg·K) was assumed for the ceramics, while the thermal conductivity was varied in the range of 0.5 to 2.0 W/(m·K), which is the range expected for clay-based ceramics (Hein *et al.* 2008b).

In a first approximation, steady state solutions were calculated for different water temperatures between the starting temperature and the boiling temperature (Fig. 4.3). At each selected temperature the energy balance of the system was examined in order to estimate its thermal efficiency. Therefore, the heat flux from the vessel's inner surface into the water was determined in comparison to the heat flux from the heat source into the vessel. Heat loss was considered in terms of heat convection from the vessel's surface and from the water surface into the ambient air, assuming the absence of a lid. E_{content} , the energy available for heating up the water, was determined from the energy that goes into the vessel's content minus heat loss from the water surface. As the heat fluxes were estimated in a two-dimensional model, their ratios were squared when

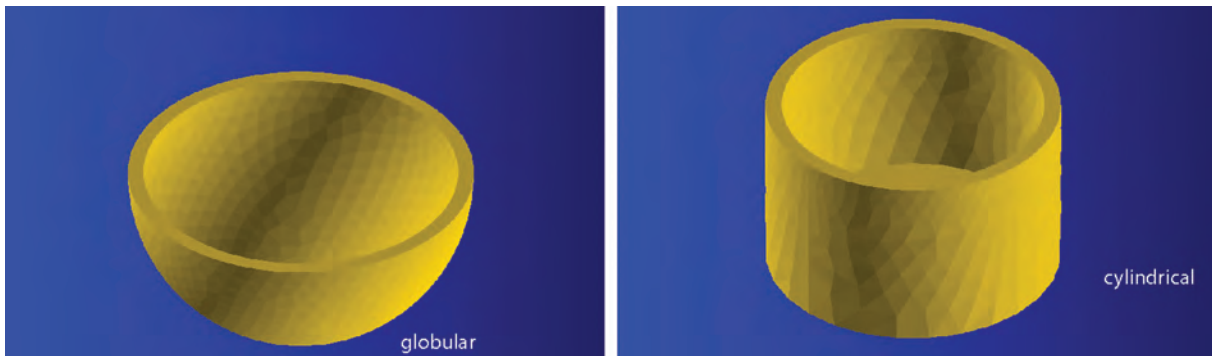


Figure 4.2. Two basic cooking pot shapes that were examined: globular shape (left) and cylindrical shape (right).

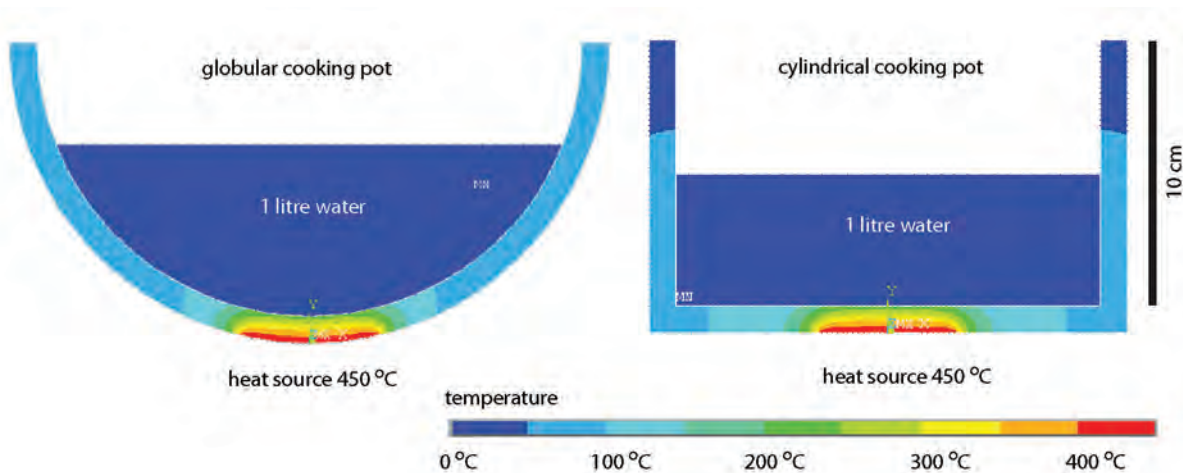


Figure 4.3. Temperature distribution in the two cooking pot models in a simulated steady state with a water temperature of 100°C and a temperature of the heat source of 450°C.

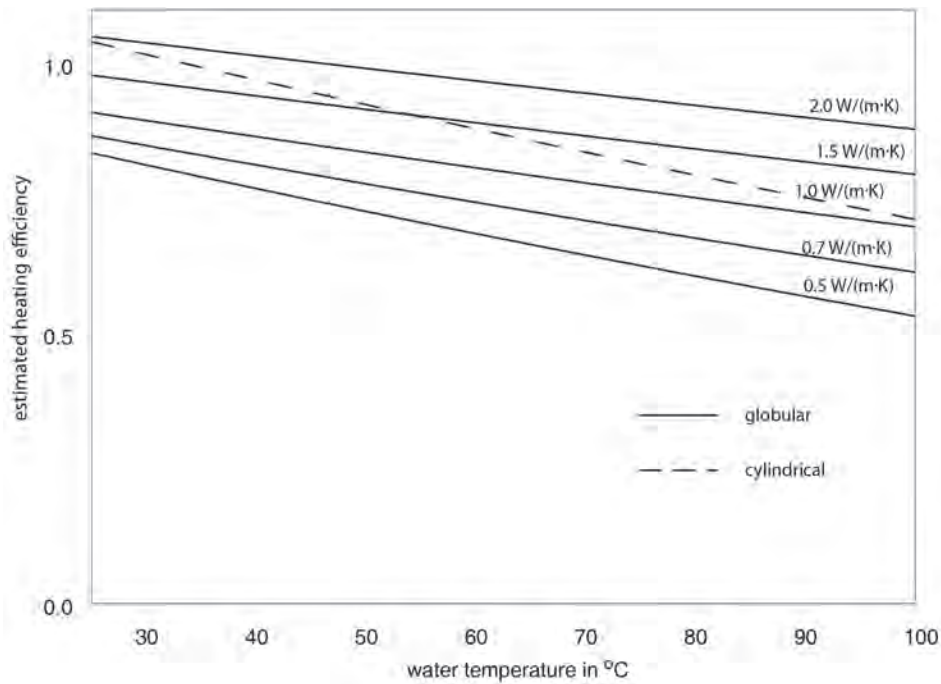


Figure 4.4. Estimated heating efficiency subject to water temperature and thermal conductivity. For the globular shape (straight lines) different thermal conductivities from 0.5 to 2.0 W/(m·K) were considered, while for the cylindrical shape (dashed line) a thermal conductivity of 1.0 W/(m·K) was considered.

estimating heating efficiency, in order to account for a three-dimensional system.

Results and discussion

The heating efficiency of the vessel model depended to a large extent on the assumed thermal conductivity of the base material (Fig. 4.4). This effect appeared to increase with the process temperature. In general, the energy loss increased with the temperature. For lower temperatures the cylindrical cooking pot presented a comparably higher heating efficiency than the globular cooking pot. Because steady state solutions were investigated, the heating efficiency was sometimes larger than unity at temperatures close to the ambient temperature. This can be explained by the heat energy absorbed by the cooking pot at the respective temperature.

Even with the steady state evaluation of the two-dimensional model basic conclusions concerning the duration of the process can be drawn. The heat capacity of water is 4182 J/(kg·K). Therefore an energy amount of 314 kJ has to be applied to one litre of water in order to heat it from 25°C to 100°C. Not considered yet is the enthalpy of evaporation at the boiling point and the heating of the cooking pot itself, which are both processes that contribute

to lower heating efficiency and increase the time required to bring the water to the boil.

Nevertheless, considering only the heating of the water, the minimum time for the process can be estimated presuming, for example, a heating source that introduces 1000 W into the model vessel, corresponding to a modern heating plate. In this case the water in the cooking vessel with a thermal conductivity of 1.5 W/(m·K) will reach 100°C after 355 s, while the water with a thermal conductivity of 0.5 W/(m·K) will reach 100°C after 469 s. This corresponds to the saving of almost 25% of process time and thus of the heat energy (Fig. 4.5).

Conclusions and perspectives

The heating efficiency of archaeological cooking vessels can be systematically assessed using digital computer models and simulations of the cooking process. In this way specific parameters can be investigated for their influence on the efficiency and performance of kitchenware. The presented example demonstrates the effect of thermal conductivity and of the shape of the vessel's floor on the heating efficiency and the duration of bringing water to the boil. The observation that differences in thermal conductivity values that fall within the range typically observed in

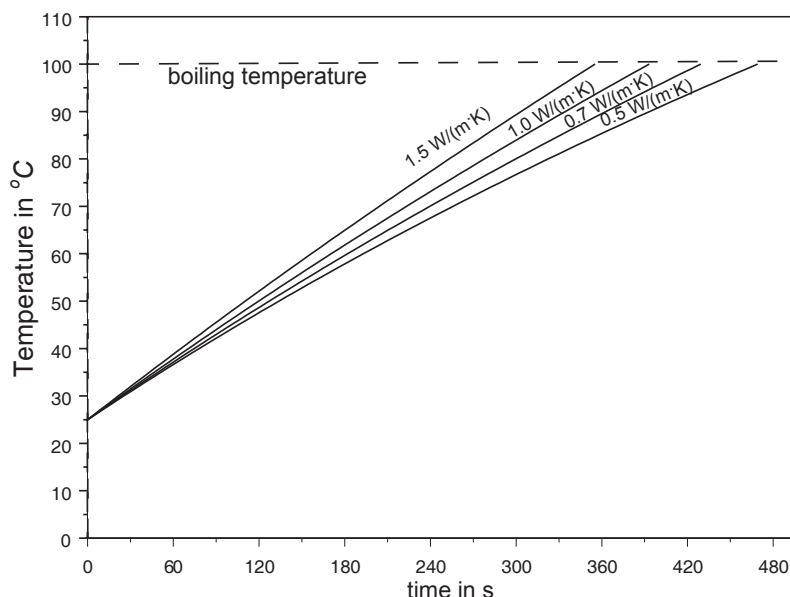


Figure 4.5. Simulated cooking process until 1 litre of water reaches boiling temperature; the globular cooking pot model was evaluated with thermal conductivities between 0.5 and 1.5 W/(m·K).

clay-based ceramics can give rise to potentially observable differences in heating time is of importance, since we know that technological choices in pottery manufacture, in particular firing temperature, but also the nature of clay and non-plastic inclusions in a ceramic, greatly influence the material's thermal conductivity.

In a similar way to that presented here, other parameters such as more detailed vessel shapes or different environmental conditions can be investigated. Furthermore, cooking processes, which are more complex than the rather simple boiling of water, can be simulated, such as the cooking of vegetables or roasting of meat. The simulation results achieved so far are still a rather rough approximation to the problem. In order to refine the approach we have to proceed to three-dimensional models and transient solutions. Furthermore, additional properties and processes have to be considered, such as evaporation enthalpy or heat radiation. Nevertheless, the results are encouraging as they provide clear and reproducible conclusions, which can be verified by experimental approaches.

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A CONTEXTUAL ETHNOGRAPHY OF COOKING VESSEL PRODUCTION AT PÒRTOL, MALLORCA (BALEARIC ISLANDS)

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Introduction

The Balearic Islands, in the Western Mediterranean, have a long tradition of ceramic production. Traditional pottery was normally divided into two main groups: unglazed ceramics, used mainly for the transport and storage of water; and glazed products, including cooking wares (Sempere 1982; Roselló and Baltasar 1997). The widespread use of metal and the introduction of plastic have considerably reduced the use of ceramic vessels and, therefore, pottery manufacture in the archipelago. In fact, the main pottery centres have reduced drastically in number and production is now concentrated on the island of Mallorca (Llorens and Corredor-Matheos 1970).

Within the framework of a larger project on Late Roman Cooking Wares in the Mediterranean (LRCWMED and LRPWESTMED: *e.g.* Cau Ontiveros 2003; 2007), one of the aspects considered was the study of living pottery-making traditions, particularly the production of cooking wares. An ethnoarchaeological approach was undertaken (*e.g.* Kramer 1985; Longacre 1991; Annis and Jacobs 1986), integrated with the application of physicochemical and minero-petrographic techniques, in order to test assumptions in the analysis of ancient ceramics (Arnold *et al.* 1991, 2000; Buxeda *et al.* 2003; Cau Ontiveros 2003; Cau Ontiveros *et al.* 2010). Regardless of the link with LRCWMED and LRPWESTMED, with specific aims in terms of the analysis of ceramic bodies, we also wish to situate our knowledge of these rapidly vanishing pottery workshops within the

growing literature on the dynamics of pottery traditions (Gosselain 1998; Day 2004; Eckert 2008). This includes the construction of tradition, issues of reputation, consumer perception and choice, and more recently a concentration on authenticity.

Cooking pots themselves have long constituted a specific focus of studies of pottery technology. Their importance has been stressed by scholars with quite different approaches. Some scholars were drawn to cooking vessels because of the specific demands placed on these pots by their repeated heating and cooling (see Tite *et al.* 2001 for a review). Others privilege their role in cuisine, or contrast them with pots that offer different affordances (Knappett 2005, 45–58), perhaps to examine themes of specialisation in craft production.

Here we are interested in clay choice and identity (Sillar and Tite 2000; Livingstone Smith 2000). Our work is based in a village, which, as a production centre with a great reputation in terms of cooking vessels, offers us the chance to examine many of these issues; we are conducting an on-going project in and around the village of Pòrtol on the island of Mallorca, in the Balearic Islands. After an exploratory visit in 2003, two brief study seasons were carried out during 2010 and 2011. Our aim is to examine the dynamics of ceramic traditions, especially those which pertain to cooking vessel production in the context of the economic changes which have taken place on this Mediterranean island.



Figure 5.1. The location of Pòrtol on Mallorca (Balearic Islands) as well as the village of Santa Eugènia and the agglomeration of Ses Olleries, and other villages cited within the text. Map C. Mas Florit.



Figure 5.2. Cooking pots from one of the Pòrtol workshops (Workshop D) being sold in a local market. Photograph M. A. Cau Ontiveros.



Figure 5.3. Water jar from Workshop J. Photograph, M. A. Cau Ontiveros.

Pòrtol: a village producing pottery

Pòrtol, in the municipality of Marratxí, situated only a few kilometres from the main city of Palma de Mallorca (Fig. 5.1), is a production centre famous for its cooking wares (Llabrés 1977; Sempere 1982; Guerrero 1988). In the past century, various potters from Pòrtol also relocated for the summer months to Lluc, where they produced and fired their casseroles and other cooking vessels. They used the clay from Pòrtol, which they transported to Lluc on horseback. Today, Pòrtol has become the main pottery-producing village (Llorens and Corredor-Matheos 1970; Sempere 1982; Guerrero 1988).

Cooking pot production on Mallorca has a long, distinct history. The main concentration of cooking vessel workshops was originally in the village of Santa Eugènia and particularly in the agglomeration of potteries called *Ses Olleries* (literally: “the cooking pot workshops”, see Fig. 5.1; Massot i Muntaner and Mut i Sureda 1989, 18). *Ses Olleries* appears in a document of 1692, when a potter from the *olleries* of Santa Eugènia is listed in the register of deaths. The production at that village, located only 9 km from Pòrtol, stopped in 1893, when the last two workshops were closed. Oral tradition suggests that, due to the exhaustion of the local clay that was used for the cooking vessels, the potters moved their workshops to the village of Pòrtol, where they found large deposits of suitable clays in the area of *ses Coves*. The place name Pòrtol appears in documents dating back to 1656, more or less contemporary to that of *Ses Olleries*, and in 1864 there were already around 20 *olleries* established in Pòrtol. So, rather than a sudden shift of the workshops from *Ses Olleries* to Pòrtol as recalled by oral tradition, it seems more likely that there was a gradual move of potters from one village to the other.

Certainly the theory of the translocation of the potters from *Ses Olleries* in Santa Eugènia to Pòrtol seems to have some weak points, at least in terms of the suggestion that the migration happened *en masse*. Miquel Coll i Canyelles (2001, 18–19) has shown how in the written documents the place names of both Pòrtol and *Ses Olleries* as inhabited settlements appeared at very similar dates. Production in both locations was linked to suitable clay sources; the name of the clay deposits in *Ses Olleries* was *sa Cova* (the cave) and in Pòrtol the clay is extracted at a place known as *ses Coves* (the caves). Geologically speaking, the area of Pòrtol hosts Quaternary alluvial deposits of low-calcareous, red clays and *terra rossa* soils. However, in addition to the red clay used for the cooking wares (and other types of pot also), not far from the village there is another clay suitable for water jars and other more delicate vessels: the white clay from *Es Pou des Coll* which, when fired, has a porosity that offers a good evaporative cooling effect that helps to keep fresh water cold (Coll 2001, 17).

Traditionally, the production of Pòrtol consists of pans, casseroles and cooking pots in general (Fig. 5.2). In addition, nowadays, they produce dishes, cups, decorated plates, flowerpots, and the figurines known as *siurells* (Vossen *et al.* 1981; Sempere 1982; Guerrero 1988).

Potters and traditions

During the 20th century, Pòrtol remained the sole centre of production for cooking vessels, a somewhat specialised location that stood in stark contrast to the many centres of production on the island that specialised in water jars. The latter were usually produced together with storage vessels and, to a certain extent, table wares. They tended to use calcareous white clay, which was found in several locations throughout the island. These different sorts of workshops were distinguished by a different name – *gerreria* – and the profession of the potter was indicated by the label *gerrer* (from *gerra*, “water jar”) (Fig. 5.3), rather than *oller* (from *olla*, “cooking pot”). A different category of ceramic object are the *siurells* (Fig. 5.4), which are rather characteristic figurines decorated normally in white, green and red paint, which have a whistle incorporated into them. These have a history stretching back to the Islamic period and are believed to bring good luck, money or love if the whistle is blown three times in a row on the night of the full moon. Beyond this poetic tradition, they used to be a common toy for children. Their production is still valued by the potting communities and they are for sale at every workshop, regardless of whether they are produced there.

The pottery-making activity of Pòrtol is organised



Figure 5.4. Examples of the *siurells* (clay figurines decorated in white and normally red and green colours) being sold in Workshop D. Photograph M. A. Cau Ontiveros.

into several workshops within the village. A total of nine workshops were still active, or were only recently closed, when we visited the area. The brief summary below is provided following the synthesis by Coll (2001); we do not refer to the page numbers of his publication, as that would allow recognition readers to identify the workshops, which we have chosen to label with letters to preserve their anonymity. The synthesis by Massot i Muntaner and Mut i Sureda (1989) is also essential for a first approach to the pottery workshops of the village.

Workshop A

Workshop A is now closed, but remains a reference point because many other potters from the village learned their potting skills there. The place was both an *olleria* and *gerreria*, combining two traditions in one large business, which employed several craftspersons. What is striking, and very important in what it reveals about the way different traditions of production were conceived of, is that the workshop had a clear separation of labour between red clays and their products and white clays and their characteristic products. The buildings that housed the workshop are still standing, preserving their traditional character. In the last phase of production at this workshop, before it closed a few years ago, the local red clay was used for the cooking wares, while for finer wares the *Sio-2* clay from Ceramica Collet S.A. in Esparraguera (Barcelona, Catalonia) was used. The jars and related products were made of clay from Villafranca in the centre of the island. The original updraft kiln had been abandoned and shortly before the workshop's closure a downdraft kiln fuelled with wood and oil was in use (Coll 2001).

Workshop B

Workshop B is probably the *olleria* that best preserves the traditional pottery-making sequence. It is still mainly focused on the production of *olles* and the more open casseroles known as *greixoneres*, although combined with other products such as coffee services, and crockery in general. The main raw material is the red clay from the village for the cooking wares and *Sio-2* for the rest of the products. Three people work there nowadays, all members of the same family. Although the traditional kiln is still preserved, it has been superseded by a gas propane kiln.

Workshop C

Workshop C is an old *olleria*, with many of the traditional

installations still preserved. The red clay from Pòrtol that was used predominantly in the past has been largely replaced nowadays by the *Sio-2* clay. Production is now mainly focused on table wares and kitchen utensils (Coll 2001). The owner works with his daughter (who is in charge of the decoration of the vessels) and his wife helps with various tasks including sales. The old kiln, while still preserved, is not in use and nowadays a kiln fired by oil is used.

Workshop D

Workshop D is owned by two brothers who used to work in Workshop A, where they learned the tradition. In 1982, after a period of recession in Workshop A, they set up their own workshop in the village. They still produce cooking wares but combine this with dishes, crockery and other table ware, such as coffee services. Red clay from Pòrtol and the clay *Sio-2* from the Iberian Peninsula are used. The kiln is fuelled by propane gas (Coll 2001).

Workshop E

Workshop E comprises a family business founded in 1925 that was divided later into two different workshops: designated here E and F. The first workshop is mainly focused on the production of table wares (dishes, cups) made of the *Sio-2* clay from the mainland. Only three males work there part-time. A woman is also dedicated to the modelling of *siurells*. One of the male potters learned his trade in Workshop A, and also worked for other workshops within the village. Workshop E, like others, preserves the old, wood-fired kiln structure, but now uses one fuelled by oil (Coll 2001).

Workshop F

Workshop F is the other part of the divided workshop, referred to in Workshop E. Its production is focused on cooking wares, table wares and other products. This workshop has introduced innovative systems, such as the use of the mechanical press mould, in order to increase its productivity. The local red clay has been used in this process, though it has been found to be unsuited to the press moulding technique. Therefore, the workshop is now experimenting with different mixtures and clays from the mainland to find suitable properties for both the method of forming and for the rigours faced by cooking wares, in order to increase the heating effectiveness and durability of the vessels. They fire in gas and oil-fuelled kilns.

Workshop G

Workshop G is unusual in that it is run by three sisters, daughters of one of the original owners of Workshop A. The elder sister was the first one to be introduced to pottery production, learning her skill in Workshop A, and progressively the other two sisters were brought into the activities of Workshop G. Production is centred around table wares, dishes, cups and other crockery. The father still produces water jars and the workshop holds the contract to produce the water jars used in a festival in the Mallorcan village of Santa Margalida (see discussion below). The clay used for the main output of the workshop is a mixture of local red clay with other clays from the island and the Iberian peninsula. Importantly, though, they use the white clay from *Es Pou des Coll* and the workshop still has a large stock of the clay, obtained before a motorway was built over the clay source. The potters of Workshop G sell their products in a shop in the centre of Pòrtol. They still have the wooden kiln that they use to fire the traditional water jars, although on a regular basis for their table wares they use a gas kiln.

The case of Workshop G is an unusual example of female labour at the potter's wheel (Fig. 5.5). Two of the sisters throw vessels, while one decorates and organises. They even care for children in their workspace, with toys and a child's cot scattered around the workshop area.

Workshop H

Workshop H is an old workshop mainly dedicated to the production of building materials (bricks and tiles), although the family came from a tradition of *ollers* and had an *olleria*. Now the son of the last owner (and his wife) are working more towards artistic production, but with plans to restore some traditional aspects of the workshop, such as one of the kilns used for firing the cooking wares in the past. The clays used in the *teulera* (tiles) were normally a mixture of different clays from the island, mainly from Villafranca and Felanitx. While the workshop preserves several old kilns, they now work with one fuelled by propane.

Workshop I

Workshop I has recently closed. During our visit we had the opportunity to talk to the owner, whose family has been devoted to the *olleria*, which was founded in 1930 by his grandfather. In recent production the workshop focused on the production of table wares and crockery made with *Sio-2°* clay. They still have a traditional kiln, but latterly the infrequent firings used gas and oil-fired kilns (Coll 2001).

Workshop J

Workshop J is dedicated to the production of water jars and related products. The owner of J learned at Workshop A under the tutelage of the potter who subsequently founded Workshop G. Before this apprenticeship, the potter of Workshop J had no family tradition. The workshop opened in 1996 and uses clay mainly from Manacor in Mallorca and also *Sio-2°* clay for the glazed vessels. They also used the clay from *Es Pou des Coll* and commonly produce bodies by mixing different clays. The kiln is fuelled by oil and the products are mainly water jars and related products, but also vessels for animal feed, plant pots and a repertoire of decorative objects for the home. One of their most characteristic products is carved, fenestrated lamps. This *gerreria* is staffed by the owner, his wife and two paid women workers.

Discussion: Changing traditions, embedding authenticity

The discussion that follows is based upon our preliminary study of four cooking vessels makers or *olleries*: Workshops B, C, D and F, which were visited in the 2010 fieldwork season. We also studied pottery production at Workshops G and J. At each workshop we made videos of interviews and methods of production, and took samples of clays used and pottery products, in order to undertake an analytical characterisation using chemical and minero-petrographic analysis. Our detailed interviews are now under study, as we compile information on local potting terminology and its link to the local traditions.

The early to mid-20th century in Mallorca brought substantial change in the demand for water jars and associated storage vessels. The availability of piped water, electricity and refrigerators meant that the need for jars to cool water diminished. At the same time, vessels of metal and plastic became more commonplace and undermined the demand for pottery jars. The *gerrerias*, which frequently were isolated production units serving a restricted market area, started to close down.

The *gerrers* were trained in very specific skills and traditions, which pertained to the wheel-throwing of calcareous ceramic bodies and their firing at a relatively high temperature. While there were also traditional mainland water jars imported to the island, of the type known as a *botijo*, the specifically Mallorcan form of the water jar dominated the market. Oral tradition seems to recall that, as demand fell around the island, Workshop A, located at a crossroads just outside the village of Pòrtol, employed *gerrers* from a number of the failing



Figure 5.5. A female potter from Workshop G on the wheel. Photograph M. A. Cau Ontiveros.

workshops. This is sometimes thought of as the start of a *gerreria* tradition in a village dominated by cooking pot manufacture. In the 1970s the workshop had several craftspeople, sharing firing facilities in updraft kilns, and the wares produced were distributed over the growing road network of the island. Workshop A went into a downturn in the 1980s and some of the *ollers* and *gerrers* employed there moved on to form their own workshops in the Pòrtol area.

The introduction of water jar making and its survival is of interest, as Pòrtol's fame and reputation was built upon the production of cooking vessels, and yet there were clear advantages for water jar and table ware makers to move there, having found a suitable light-coloured calcareous clay not far from the village. In fact, oral tradition tells us that the *gerrers* were basically installed in the neighbouring village of Sa Cabaneta, closer to the calcareous clay outcrops. In Pòrtol, even though some of these potters had no family connection to the jar-maker tradition, they kept the professional label *gerrer* and its technological

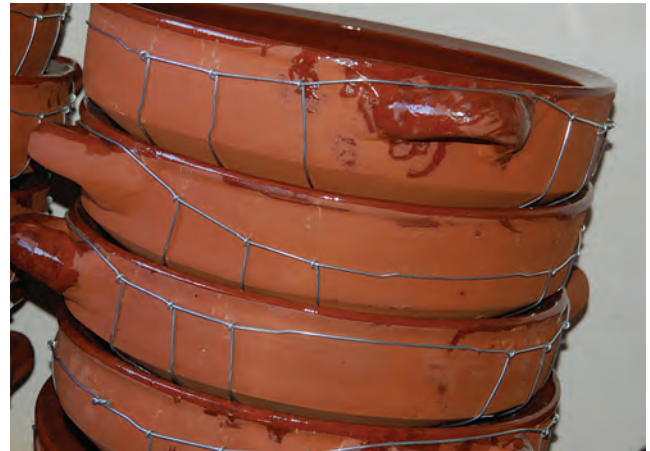


Figure 5.6. *Greixoneres*, stock for sale. Photograph M. A. Cau Ontiveros.

baggage just as if they had inherited it from their closest family. Workshop J is the business of a well-known and respected *gerrer* nowadays who, as we have noted, had no family tradition, but used to work in Workshop A, where he learned his skills from a *gerrer* (Fig. 5.3).

All this is evidence of a strong oral tradition pointing to Workshop A as the source of an intrusive water jar tradition (while it also produced cooking pots with red clays). But whichever way the water jars were introduced, the *ollers* and *gerrers* coexist in the village and this poses some key questions. How do the cooking pot makers of Pòrtol construct their identity and maintain their tradition in these circumstances?

The main specialist product of Pòrtol is the *olla*; this is a globular, deep shape with handles placed around the out-turned rim, which was used for boiling in the local cuisine. When we first visited in 2003, the potters were still producing a large number of *olles*, which were made in a variety of sizes. These were sold directly from the workshops themselves and in regional markets, as well as being distributed to merchants in other villages around the island. The other very popular cooking shape was the *greixonera* (Fig. 5.6), which is a shallow vessel used for frying and stewing. It has a slightly curved base and was used over an open fire. The *olles* and *greixoneres* have sub-classifications, named according to their particular function. The common classification for *greixoneres* is related mainly to the capacity of the vessel types (Fig. 5.7).

Both of the main cooking vessels were made with relatively coarse, non-calcareous, bright red firing clay on the wheel – both kick-wheels and the electric version – and were finished by scraping and turning the excess clay from the thrown shape to produce the globular or curved base. Both *olles* and *greixoneres* are placed upside down on the wheel and then turned to the required thickness.

OLLAS

saïmera (for the *saïm*, lard)
calderó (cauldron)
fonda (deep) or with tall neck

GREIXONERES

cassolí o *biel* (0.25 litre capacity)
treset (0.5 litre)
malaguenya (1 litre)
ladra (between 1 and 2 litres)
mitja mà (3 litres)
perol (5 litres)
catorze o *kilo* (6 to 7 litres)
setze (8 to 10 litres)

Figure 5.7. Terminology for different sizes of *ollas* and *greixoneres*.

In our study season of 2010, several aspects came to the fore. Firstly, we noted the near disappearance of the *olla*, one of the specialist products of the village. While it is still produced and evident in each of the workshops, it is present in smaller numbers and is certainly no longer the dominant shape. Though there are exceptions, it appears mostly in very small sizes and the workshop that had a large number to sell – Workshop D – told us that an unglazed version is sold as a *pinyata*, a pot filled with sweets and then broken with a stick at birthday parties by blindfolded children. In contrast, the *greixonera* continued in production, with the full range of vessels being made. It is still common to use the very large version of these vessels over specially adapted gas rings, especially for the preparation of food on special occasions such as festivals, family celebrations or the special days of butchering pigs to prepare *sobrasada*, a local type of meat paste, as well as other pork products.

The greatest difference we observed, compared to the exploratory visit in 2003, was the introduction of an altered *greixonera*, which has higher sides and a flat base suitable for use on the ceramic hobs of modern cookers. Workshop C claims to be the inventor of this shape, which they call *greixolla* as a hybrid term between *greixonera* and *olla*. At Workshops B, C and D the hybrid shape is produced with exactly the same sort of clay and firing as the traditional shapes. Their authenticity is emphasised. They belong to the “true tradition” and possess the beneficial physical properties which are afforded by the use of the local red clay. In fact, each of the potters sells the range of cooking vessels and claims the products on sale in their showroom as being their own. They emphasise their “belonging” to the tradition of cooking pot makers through the terminology they use and by the central placement of their products on sale.

Almost all workshops use the same clay source for



Figure 5.8. Local red clay store at the back of Workshop B. Photograph P. M. Day.



Figure 5.9. Water jars (*gerres*) from Workshop G prepared for the festival in Santa Margalida, where the pots will be smashed as part of the proceedings. Photograph M. A. Cau Ontiveros.

cooking vessels and we were told that they obtain the clay together, bringing lorry-loads to all the workshops every few years. Therefore, in this case, the clay should be relatively homogenous over longer periods of production within workshops – the potters process the clay individually, but with similar techniques, involving crushing, sieving and the use of a finer fraction (Fig. 5.8). We have taken clays, pastes and product samples from different workshops and whenever possible from the same workshop over time, in order to investigate variability in terms of petrography, X-ray diffraction and chemical composition.

But as we spoke at greater length with potters, it became less clear whether every *olleria* produced these, the specialist product. Two of our four *ollerias* turned out to have been “economical with the truth”. As conversations

progressed over time, it became clear that a few of the workshops were buying in cooking vessels and selling them on to the public as their own products. Their legitimacy as potters was clearly based upon all the ascribed virtues of the Pòrtol cooking pot makers, though in reality it is becoming less economic to produce and sell those specific vessels. Laying claim to being a true follower of the tradition is important. In fact, those in different *olleria* workshops are supportive of each other, cementing their link to the reputation which guarantees quality associated with their village.

There is one *olleria* which is considered to lie outside the tradition. It is the one that strays from the “true path” of adherence to forming methods and – more specifically – of using the same, special clay. While explicitly linking his production to the cooking pot tradition, the owner of this workshop showed us his new products, which are made in a ceramic press. Problems arise with this, as the local red clay is not suitable for use with the press. His main shape is, unsurprisingly, the vessel with the flat base, but the vessels made with this technique and with the local clay tend to fail after fewer cooking episodes. This is why he uses a new mix of clays and experiments with new recipes made out of raw materials from elsewhere, in the quest for a better-quality product. Of course his are the classic problems of unit cost and effectiveness of the product. Yet he is reliant on the reputation of the village to sell, and his products do not reflect the characteristics on which the reputation of the cooking vessel is founded. Hence his *olleria* and his innovative methods may be not well understood by all workshops, and in turn he has some objections to the “tradition”, considering that some aspects of it are out of date.

Using the right clay is important to the potters. The *gerrers* and *siurell* producers complain that a new motorway has been built over the white clay source of *Es Pou des Coll*, which was the mainstay of their tradition. Those who still have stocks of the clay happily point out the authenticity of their product. Workshop J still produces water jars, but now concentrates on a wide range of pottery including fenestrated garden lamps *etc.* The owner of the workshop is, however, following a long tradition of *gerrers* who produce a range of jars and ornamental ceramics. But his showroom sells the full range of products of the village, such as cooking pots made by the *ollers*, and also *siurells* made by the wife of one of the owners of Workshop D.

More telling still is the example of Workshop G, where they produce authentic water jars in large quantities (Fig. 5.9). We are told proudly that these vessels are made in the traditional way from light-firing clays: a valuable characteristic for their demanding function as porous, cooling water jars. In addition, they are fired in a traditional wood-burning kiln. Yet the lauded suitability of their

material is not, in fact, relevant. While these vessels may be “the real thing”, they are bound for the festival of the village of Santa Margalida, where they will be smashed on their first day of use as part of the proceedings.

It is striking, then, that the producers of both *olles* and jars (*gerres*) gain kudos from relying on traditional skills and especially from the use of their functionally-specific, special clays; even when those vessels are not going to be put to the use for which they have been designed. Especially in the case of the cooking vessels at Pòrtol, they are emphasised as the true local product, a situation acknowledged even by potters from the jar tradition. *Siurells* are sold everywhere and yet it is clear that they are made by only a few specialists, some male and some female. They too benefit from being understood as local and traditional. Most other types of vessels sold in the showrooms have their origins obscured, but either the pots’ form or their discarded cardboard boxes betray an origin in other areas of Spain from factories of mass production. Thus the reputation of the cooking vessels, essentially gained from a very special deposit of clay, legitimates the authenticity and traditional nature of a whole host of ceramic products.

Concluding remarks

In the case of Pòrtol, which has a strong identity and reputation as *the* cooking pottery production centre on the island of Mallorca, specialisation in *ollas* and *greixoneres* was what made the tradition survive when production of other shapes across the island faced a collapse in demand. When the arrival of piped water and refrigeration caused a decrease in the daily use of water jars, and the replacement of many ceramic vessels by metal and plastic continued to increase over time, the island witnessed the progressive abandonment of its many pottery workshops.

Pòrtol bucked the trend due to the continued demand for its specialist product, cooking pots, buoyed by family- and village-based commensal events which used *greixoneres* and by the continued popularity of the *olla* as a cooking vessel. This is not to say that demand for its products did not drop also to some degree, but at the same time it acted as an attractor for craftspersons from other ceramic workshops which were closing over the whole of Mallorca. What Pòrtol experienced was the agglutination of other ceramic traditions, which were not originally prominent in the village: the *gerrer*’s products.

Perhaps illustrative of this change was the establishment of Workshop A, at the edge of Pòrtol village, which produced pots of both the *gerrer* and *oller* traditions. While we first thought of this to have been a move which may have diluted the strong cooking vessel tradition, or to have produced potters of a somewhat “hybridised” tradition,

the reality is far more surprising and rather instructive. It was puzzling that potters who had worked for this business clearly identified themselves as *ollers* or *gerrers* by tradition. Puzzling, that is, until we learned that production in Workshop A was divided spatially and by personnel into red clay/cooking vessel production and white clay/jar production. Even though this was one business, the two traditions were divided almost entirely. The *olla* tradition, based on a long history, remained dominant and, as always, the selling point of the village.

More recently, the numbers of workshops producing the true cooking pots from local clay has fallen. The perception of who adheres to the “true tradition” is used in the discourse of competition between craftspeople, often with humour and sometimes in dismissal of skills or practices which have been lost, but are perceived to be still preserved by some potters. Retail areas of workshops always have cooking pots placed very prominently, even if they obtain their supplies from colleagues at other workshops. When the workshop selling the cooking pots is a *gerreria*, there is no perceived problem, but ones that come from a tradition of *ollers* are bound to maintain that the cooking pots are their own products.

Our fieldwork and the analysis of interviews, written documents and samples of both clays and ceramics are still ongoing. Nevertheless we have tried to give some preliminary insights into a ceramic tradition embedded in Pòrtol and its territory that has its roots in cooking ware production, but that with time, crisis and adaptation has absorbed ceramic practices and products from all over the island of Mallorca and beyond. It has notably adopted ceramic classes and procedures from outside its own tradition and worked to convert them into successively newer versions of the “true tradition”, on account of the prestige and identity generated by generations of cooking ware producers.

While it may be common for cooking pot traditions to have their origin, as in the case of Pòrtol, in the specialised raw materials and perceived technical performance of vessels, over time these beliefs and values become entwined with other factors in the negotiation of craft identities. This is especially evident in the case of changes such as those experienced during the second half of the 20th century, and they have much to teach us about the interplay between technologies, reputation and society.

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Note

- 1 For evaluation purposes both Peter M. Day and Miguel A. Cau Ontiveros should be considered as first authors.

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AEGINA: AN IMPORTANT CENTRE OF PRODUCTION OF COOKING POTTERY FROM THE PREHISTORIC TO THE HISTORIC ERA

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Introduction

Archaeological research on the island of Aegina and beyond during the last decades has clearly shown that Aegina was a major centre for the production, as well as the distribution, of a variety of ceramic vessels from the prehistoric to the historic era. Our contribution aims to highlight its importance as a production centre of cooking wares, firstly in the Early, Middle and Late Bronze Age and secondly during Archaic to Late Classical times.¹

Aeginetan cooking ware production in prehistoric times

Aegina was one of the major centres in the Bronze Age Aegean region. Its importance was, in part, due to its geographical position in the centre of the Saronic Gulf, at the crossroads of important routes between central mainland Greece, the northeast Peloponnese, the Cyclades and Crete. The site of Kolonna, the main settlement known on the island, thrived for almost a millennium, from the advanced Early Bronze Age (c. 2250–2100/2050 BC)² at least to the Shaft Grave period in the early Late Bronze Age (c. 1635/1600–1480/1470 BC). The regional importance of the site is illustrated by its impressive fortifications and wealth of material remains.³

During this period, two main fabric types were in use in the local ceramic industry; the first (“Macroscopic Group 1” and “Fabric Group 1”) (Gauss and Kiriati 2011, 47–49; 93–99), being coarse, red-firing and non-calcareous, was associated originally with table wares and subsequently predominantly with cooking wares (Fig. 6.1a),⁴ whereas the second (“Macroscopic Group 2” and “Fabric Group 2”), being fine to medium-coarse, buff- to orange-firing and calcareous, was used exclusively for table wares and storage vessels, usually patterned or solidly painted (Gauss and Kiriati 2011, 49–50; Kiriati *et al.* 2011, 99–104).

Macroscopic Group 1 comprised hand-made pottery with a usually unpainted surface, unburnished, burnished or polished, of dark grey, black or brown appearance.⁵ Shiny golden (mica) inclusions up to 2 mm in size and black shiny together with sparkling ones of indistinguishable colour, comprise the most diagnostic features visible on the surface in hand specimens.⁶ A fresh break shows mainly shiny black, matt chalky white and small sparkling inclusions of indistinguishable colour.⁷ The fabric is coarse and relatively porous with a non-calcareous clay matrix, containing predominantly fragments of local volcanic rocks mostly of andesitic composition. Petrographic and chemical analysis allowed a further subdivision of Fabric Group 1 on the basis of the different types of amphibole present (Kiriati *et al.* 2011, 93–99, 128–134).

The Early Bronze Age III (c. 2250–c. 2100/2050 BC)

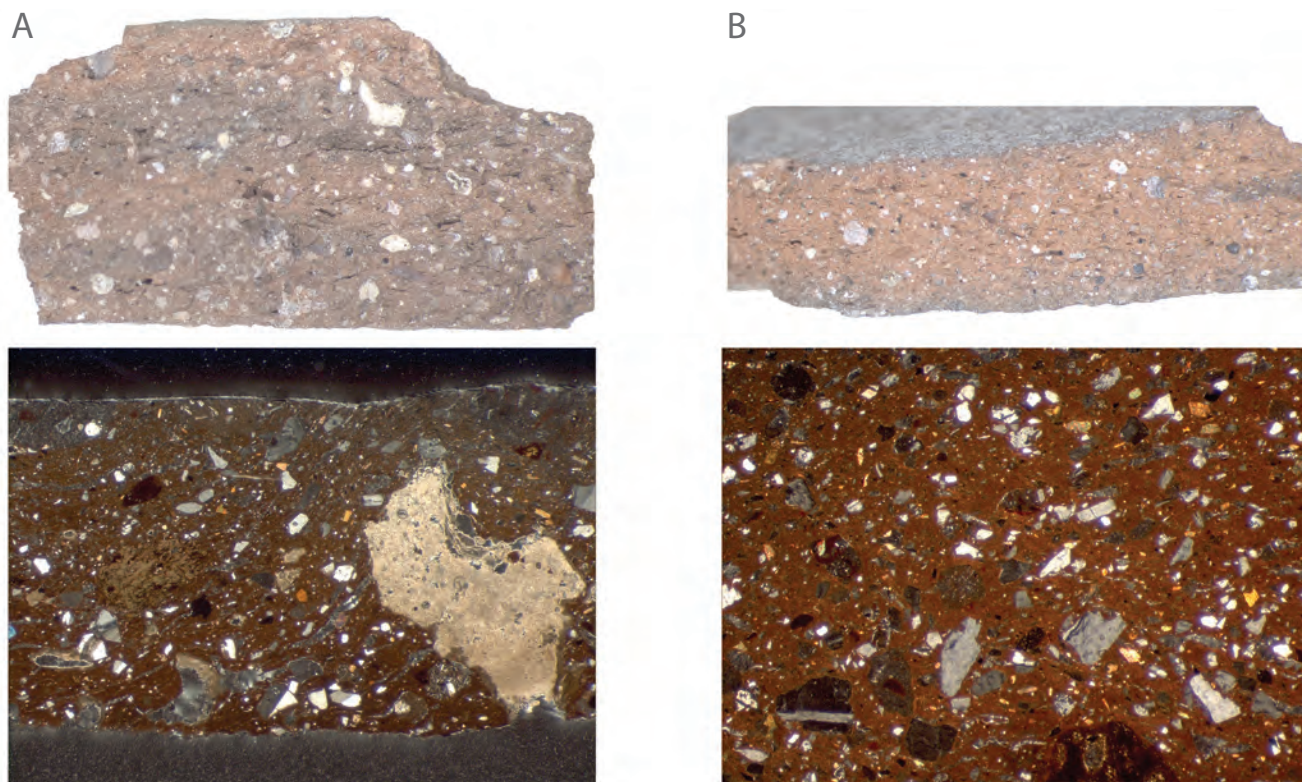


Figure 6.1. Close-ups of fresh breaks and thin sections of prehistoric and Classical Aeginetan cooking ware (XPL, field of view 5.9 mm). A: Middle Bronze Age wide-mouthed jar (Gauss and Kiriati 2011, 451 fig. 73 KOL 101). B: Late Classical *chytra* (Gauss and Kiriati 2011, 482 fig. 104 KOL 257). Photographs Fitch Laboratory British School at Athens and W. Gauss.

version of this fabric (Fabric Group 1B) contains mainly green amphibole. Outcrops of green amphibole-bearing volcanic rocks have a limited distribution on Aegina, lying mainly in the central western part of the island and around the Palaiochora area (Kiriati *et al.* 2011, 131–134; Gauss and Kiriati 2011, 249, 410 fig. 32). Interestingly, however, in Early Bronze Age III a small number of pots, particularly those associated with cooking, were made with the use of another version of Fabric Group 1 (Fabric Group 1A) containing brown amphibole. Outcrops of such volcanic rocks are located close to the coast south of Kolonna (Kiriati *et al.* 2011, 131–134; Gauss and Kiriati 2011, 249; 410 fig. 32). The use of this latter source dominated in the subsequent phases of the Middle and Late Bronze Age, thus marking a significant shift in the location of the raw material sources and possibly of the production units themselves (Gauss and Kiriati 2011, 249).

In Early Bronze Age III, about 2250–2100/2050 BC, almost all local pottery, except when patterned and solidly painted, was made of Fabric Group 1. The most common open and closed shapes are shoulder-handled bowls⁸ and tankards⁹ (Fig. 6.2). The main cooking vessel is the wide-



Figure 6.2. Prehistoric tankard from Aegina-Kolonna. Photograph by W. Gauss.



Figure 6.3. Middle Bronze Age wide-mouthed jar from Kolonna. Photograph by W. Gauss.

mouthed jar,¹⁰ produced in various sizes and with various kinds of handle attachments. Most vessels are dark and fired in conditions not rich in oxygen and in relatively low temperatures (not exceeding 800–850°C) (Gauss and Kiriati 2011, 248). Regarding the surface treatment, interesting differences can be observed. Early Bronze Age III pottery of Fabric Group 1 is in general intensively burnished, except for the wide-mouthed cooking jars (Gauss and Smetana 2007, 455–456 with figs. 17–18). Here the interior and exterior sides of the rims are burnished, whereas the neck and shoulder zones as well as the lower parts of the body are only partly burnished or unburnished. The lower parts of the vessels are also often heavily burnt, as if they stood very close to or actually in the fire during cooking.

In the Middle Bronze Age, about 2000–1650 BC, pottery production on Aegina continues without a sharp break with the preceding period. Pottery of Fabric Group 1 is still hand-made and is almost exclusively used for household and cooking purposes. Recent analysis has shown that the cooking ware fabric (Macroscopic and Fabric Group 1) is now associated with volcanic rocks containing brown amphibole.¹¹

Wide-mouthed jars continue to be the most popular kitchen ware vessel. The shape is usually handleless and has an ovoid body, sometimes on a raised foot. The main difference compared with their Early Bronze Age predecessors is the absence of burnishing and we also note that fewer pots show traces of burning in the lower body zones. Two interesting phenomena in Aeginetan pottery production make their first appearance in the Middle Bronze Age: the wide-ranging export of pottery, and marking with pre-firing marks, so-called pot-marks.¹² The marks are of simple design, and are most commonly found in the shoulder zone, at the handle or on the base of cooking pots (Fig. 6.3 shows a Λ-shaped incision on the shoulder immediately below the rim).

At the end of the Middle Bronze Age and the beginning of the Late Bronze Age, Aeginetan pottery production reaches its peak.¹³ Numerous vessels of kitchen ware and fine ware are produced and exported, particularly to the immediately adjacent areas of the Saronic Gulf, the northeastern Peloponnese and Attica (Gauss and Kiriati 2011, 242–245, 250–254; Lindblom 2001, 112, 116, 130). The cooking pottery is hand-made and almost all complete vessels are pot-marked.¹⁴ The most popular Middle Bronze Age cooking pot, the wide-mouthed jar, continues to be produced (Fig. 6.3). The shape developed, as it now has a distinct ovoid body, sometimes on a raised foot. But from the beginning of the Late Bronze Age a new shape, the tripod with one or two handles, becomes very popular. Pot-marks are usually found at the handle or at the junction between foot and body. Tripods and wide-mouthed jars continued to be produced and exported to distant regions (as far north as Dimini) until the 12th century BC.¹⁵

The distribution of prehistoric Aeginetan pottery shows interesting patterns, particularly regarding the distribution of the two different fabric groups (Fig. 6.4).¹⁶ So far only a few Early Bronze Age III exports have been identified outside the island, and none was of the cooking ware fabric (Gauss and Kiriati 2011, 242). This situation changes in the Middle Bronze Age, when all types of Aeginetan pottery are found in quantity in the area of the Saronic Gulf and beyond, as shown in Fig. 6.4. In the first half of the second millennium BC Aegina emerges as an important economic and political centre, comparable only to those of Crete, playing an important role in central Aegean networks. Aeginetan pottery, including cooking pots, was obviously exported as a product in its own right, and not just for its contents. This situation changed after the early phases of the Late Bronze Age with the emergence of new administrative centres on the Greek mainland. The Aeginetan potting industry now seems to concentrate mainly on the production and export of cooking pots. The organisation of the potting industry on Aegina during the Mycenaean palatial period (1420/1410–1200/1190 BC) is

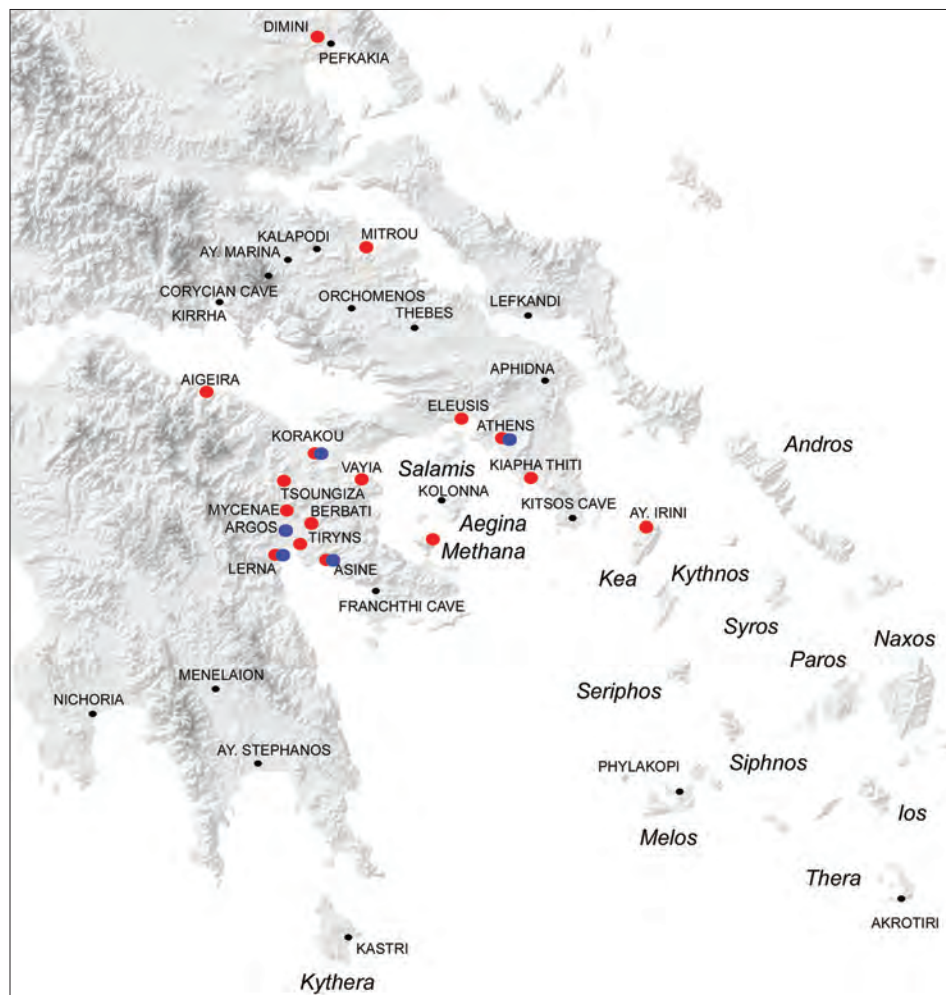


Figure 6.4. Distribution of Aeginetan cooking ware in the Bronze Age (blue MBA, red LBA) times. Image by W. Gauss based on map of Greece & Balkans © Anavasi and H. Birk.

not yet well understood and evidence is lacking for any association with (or even dependence on) the Mycenaean palatial centres of the Argolis (Mycenae, Tiryns and Midea). The export of Aeginetan cooking wares continued until the end of the so-called Mycenaean palatial system around 1200–1190 BC and even beyond, at least for a few decades, to the ceramic phase of Late Helladic IIIC Early. However, in the course of the 12th century BC Aeginetan exports and the production of cooking ware seem to cease, although the exact reasons for this are still unclear.

Aeginetan cooking ware production in historic times

In the Late Archaic and Classical periods Aegina evolved once more into an important production centre for pottery.

The numerous finds of cooking pots, pans and jars made of a red-brown coarse fabric in Kolonna and Aphaia have led, from the very beginning, to the assumption that local pottery production existed on Aegina (e.g. H. Thiersch in Furtwängler 1906, 441; Jennings 1990, 66–69; Hiller 2000, 467; Kerschner 2001, 89). This assumption is also supported by ancient written sources mentioning local clay vessels, “χυτρίδων ἐπιχωρίων” (Hdt. 5.88.2) and referring to Aegina as “pot seller”, “χυτρόπωλιν” (Pollux 7.197. Hesychios, η 1025).¹⁷ In spite of the presumed importance of the Archaic and Classical Aeginetan cooking ware production, detailed research on this subject has so far been lacking. Our recent studies on the pottery from Kolonna have provided for the first time a comprehensive picture of the range of shapes and the technical characteristics of the contemporary Aeginetan cooking wares.¹⁸

The Archaic-Classical Aeginetan cooking ware fabric is



Figure 6.5. Early Archaic Aeginetan common-type *chytra* from Aegina-Kolonna. Photograph by G. Klebinder-Gauss.

of a red-brown colour, coarse-grained and tempered with volcanic rock fragments (Fig. 6.1b).¹⁹ It was in use without major changes or shape-specific variations throughout the Archaic and Classical periods. Interestingly, this fabric is compositionally very similar to the one used in the Middle and Late Bronze Age (“Macroscopic Group 1” and “Fabric Group 1”; Fig. 6.1a), with only minor differences, indicating the use of the same raw material sources with slightly different clay recipes.

The earliest evidence so far for the use of this local cooking ware fabric in the historic era dates to the first half of the 7th century BC. It concerns round-bottomed *chytrai* (Fig. 6.5), still hand-made and already showing the burnishing of the surface that is very characteristic of Aeginetan cooking wares.²⁰ As yet, we lack any evidence from the immediately preceding centuries indicating an even earlier resumption of Aeginetan cooking ware production (or even continuity from the Late Bronze Age), but this absence may be due to the lack of good stratigraphic contexts from this period at Kolonna.²¹ It is, however, hardly imaginable that the possible advantages of the raw materials available on Aegina for the production of cooking ware – discussed below – would not have been known in the Geometric period. Future research will hopefully help to close the gap between the Late Bronze Age and the Early Archaic cooking ware production.²²

According to our present state of knowledge, the heyday



Figure 6.6. Aeginetan common-type *chytra* from Aegina-Kolonna, context c. 480–470 BC. Photograph by G. Klebinder-Gauss.

of the Aeginetan cooking ware production was in the Late Archaic period and in the first three-quarters of the 5th century BC. During this period, productivity increased dramatically, the manufacturing techniques – discussed below – were enhanced and the range of shapes was considerably enlarged. Besides one-handed common-type *chytrai* (Figs. 6.5–6.6; cf. also Rotroff this volume, Fig. 16.5 left), other cooking pots such as lidded *chytrai* (Fig. 6.7) and *lopades*, or cooking devices for roasting and baking such as pans, braziers (Fig. 6.8), sieves, griddles and ovens were now also produced on Aegina.²³ It seems to have been Aeginetan workshops that introduced shapes such as the lidded *chytra*, *lopas* and brazier to the regions adjacent to the Saronic Gulf, as they make their first appearance here in the Aeginetan fabric.²⁴ But vessels that were not specifically intended for heating, such as water containers, bowls or storage bins, were also made of the same fabric. Other fabrics hardly occur in the Aeginetan pottery production of this period. The buff Aeginetan clays that immediately recall popular local products of the prehistoric and modern period seem to have been known, but rarely used.²⁵

Towards the end of the third quarter of the 5th century BC a massive decline of the Aeginetan cooking pottery production and its export can be observed. This is probably connected with the increasing decline of Aeginetan trade power after the occupation of the island by the Athenians in 456 BC, and especially with the expulsion of the local population in 431 BC.²⁶ The latter event most likely also caused the departure of the local potters and thereby brought the cooking ware production on Aegina to a temporary end. At the very end of the 5th century BC some of the exiles returned,²⁷ and also the production of cooking ware was at some point resumed, as is well proven by a



Figure 6.7. Aeginetan lidded *chytra* from the Athenian Agora (P 5184), context c. 470–460 BC. Photograph American School of Classical Studies at Athens: Agora Excavations.

waster²⁸ from the second half of the 4th century BC, but it never again reached the status of past ages.

Consumption of Archaic and Classical Aeginetan cooking ware: a matter of quality?

The specific quality and appearance of the Aeginetan cooking ware is the result of several characteristic production techniques. These include the use of the wheel since the 6th century BC, also for round-bottomed shapes (Fig. 6.9; cf. also Rotroff this volume, Fig. 16.5 left).²⁹ Another specific feature is the scraping of the lower body's interior with a flexible small strip of wood or a similar tool, leaving angular impressions and irregularly overlapping stripes of parallel striations (Fig. 6.10).³⁰ For better accessibility of the interior, these vessels were usually made in two separate steps, with the shoulder and neck added to the body only after its interior surface had been smoothed by scraping. The exterior surface is carefully wet-smoothed and burnished, creating regular shiny stream marks (Figs. 6.5–6.6); only from the later 5th century BC onward is burnishing increasingly replaced by a cover of thin reddish wash. The appearance of burnishing marks and wash also on the (usually not visible) underside suggests that these were not simply decoration patterns, but had a certain functional purpose. All these techniques must have helped to make the wall thinner and more even and the surface smoother and denser, probably in order to improve the utilitarian performance characteristics of the cooking vessels (on which more below).³¹

Unfortunately so far we do not know enough about



Figure 6.8. Aeginetan brazier from the Athenian Agora (P 21956), context c. 460–440 BC. Photograph American School of Classical Studies at Athens: Agora Excavations.

the organisation and the location of the Archaic-Classical Aeginetan cooking ware production. However, the varied range of shapes and the high degree of standardisation in fabric and manufacturing techniques, as well as the large number of finds, also outside of the island, indicate a specialised production for local supply as well as for export.³²

The wide distribution of Aeginetan cooking ware vessels outside of the island during the 6th and 5th centuries BC is interesting not only in regard to the trade in coarse ware pottery in general, but also with relation to the island's economy. So far Aeginetan imports have been identified not only in the wider surrounding of Aegina, as e.g. in Attica³³ and Corinth,³⁴ but also in Crete,³⁵ in the North-African Cyrenaica,³⁶ in the Pontos region,³⁷ in southern Italy³⁸ and as far west as the Mediterranean coast of France.³⁹ Such a wide distribution, often over long periods, can hardly be explained along the lines of the model “cooking pots = people”; rather, we must be dealing with trade and continuous exchange. The distribution of Aeginetan cooking ware matches quite well the network of the Aeginetan fleet, which maintained trade connections with all these regions and places: as we can conclude from various sources, Aegina emerged from the 7th into the 6th and 5th centuries BC as one of the important trade centres in mainland Greece with far-reaching contacts within the Saronic Gulf and beyond.⁴⁰ As the island is too small to have sufficient resources for a substantial production of export items other than pottery, it is generally assumed that the Aeginetan ships transported mainly foreign goods, such as grain, metals and slaves (e.g. Figueira 1981, 192, 231–236; Hiller 2000, 467). Cooking ware is thus one of the island's few local products and the name of Aegina as “pot seller” may therefore primarily refer to that.

The fact that long-term and far-reaching export patterns of Aeginetan cooking ware existed indicates that the latter was particularly appreciated. This is quite well demonstrated by the example of Athens, which for more than two centuries far preferred Aeginetan fire-resistant cooking vessels to its own products.⁴¹ Nevertheless, it



Figure 6.9. Interior of a Classical Aeginetan cooking ware *chytra* with wheel marks. Photograph by G. Klebinder-Gauss.

still remains difficult to pinpoint precisely what made the Aeginetan cooking pottery so attractive for the many consumers around the Mediterranean and beyond. Interestingly, only vessels for use over the fire were exported from Aegina, whereas jars and amphoriskoi of the same fabric have so far not been found beyond the island. One might, therefore, conclude that the Aeginetan cooking ware fabric was recognised as superior in withstanding thermal shock and in conducting heat more effectively. These two demands are certainly among the most important ones that a good cooking pot had to meet in order to become popular with consumers – especially a cooking pot chosen by consumers in distant places who often had no particular affiliation with Aegina and its wares in terms of social or cultural relationships.⁴² The Aeginetan cooking ware certainly fulfils some of the physical criteria that are generally thought to be advantageous for an efficient cooking pot.⁴³ Tempering with substantial quantities of inclusions is thought to be important in order to avoid micro-crack propagation and increase toughness, while platy inclusions provide strength – both are present in Aeginetan cooking ware. Volcanic inclusions, also abundant in the Aeginetan fabric, are frequently found in cooking ware fabrics, although their specific advantages are still unclear.⁴⁴ Surface finishing, such as burnishing, has been shown to reduce permeability, thereby improving heating effectiveness and avoiding the intrusion of flavours into the vessel wall. Thin, even walls and round-bodied shapes, characteristic of Archaic and Classical Aeginetan *chytrai* and *lopades*, are supposed to have a positive effect on even and effective heating, thereby avoiding large temperature



Figure 6.10. Interior of a Classical Aeginetan cooking ware jug with scraping marks. Photograph by G. Klebinder-Gauss.

differences within the wall that might cause damage. However, the particular advantages of these respective mechanical properties and their specific interaction within the Aeginetan cooking ware require further research.

Besides potential technical advantages, consumers abroad might also have been attracted by other attributes of the Aeginetan cooking ware, such as the wide range of shapes, some of which may have facilitated cooking, or introduced new ways of cooking. Particular tactile and visual qualities of the soapy-smooth and lustrous surface of the Aeginetan cooking pots might also have appealed to consumers. Another precondition of popularity, that of ready availability, is especially well fulfilled in the case of the Aeginetan cooking ware: the intensive trading activities and the extended trade network of the Aeginetan fleet guaranteed the constant availability of Aeginetan cooking ware even in distant places.

Summary

Our research has been able to clearly define the cooking ware fabrics and manufacturing techniques used on Aegina in the Bronze Age and the Archaic-Classical period. The Aeginetan cooking ware fabric is tempered with local volcanic rock, mainly of andesitic composition, and the visibility of gold-mica and black shiny inclusions at the surface is one of its characteristic features. The close similarity of the prehistoric and the Archaic-Classical fabrics, as clearly revealed by petrographic and chemical analysis, suggests that similar types of raw materials – or even the same sources – had been used for a very long time, from the end of the 3rd millennium to at least the end of the 4th century BC.

In both periods the wide distribution of Aeginetan

cooking ware pottery is remarkable. The long tradition of export suggests a particular appreciation of Aeginetan cooking pots on the part of consumers in many areas of the ancient Mediterranean that was probably related primarily to their (actual and perceived) technological and functional qualities. In both cases the distribution seems to be connected with the far-reaching Aeginetan trade network. Pottery was surely not the foundation of the Aeginetan trade, but this network formed the basis for the constant availability of Aeginetan cooking ware; and the Aeginetans, as clever merchants, obviously understood well how to commercialise their undoubtedly much-appreciated cooking pots. Hence the study of Aeginetan cooking ware can contribute not only to our knowledge of the Aeginetan economy, but also to the general discussion of trade in coarse ware. Further studies will hopefully enlarge our understanding of the specific qualities of Aeginetan cooking pottery and its distribution beyond the island.

Notes

- 1 The results presented here are the product of a long and intensive collaboration between the Fitch Laboratory of the British School at Athens and the Austrian excavations at Aegina-Kolonna; see Gauss and Kiriati 2011 and Klebinder-Gauss 2012.
- 2 Regarding absolute dates for the Aegean Bronze Age see in particular Manning 2010; on Aegina-Kolonna see Wild *et al.* 2010.
- 3 Regarding the importance of Aegina see the recent summaries by Rutter 1993, 775–781; Gauss 2010; see also Gauss and Kiriati 2011, 19–21, 380 fig. 2.
- 4 Gauss and Kiriati 2011, 47–49; 93–99; see also I. Whitbread in the present volume, who also discusses Aegina amongst other cooking ware production centres in the Aegean.
- 5 On the method of the macroscopic description see Gauss and Kiriati 2011, 42–47. Regarding Macroscopic Group 1 see Gauss and Kiriati 2011, 170–172 (EBA III, unpainted and burnished); 172–173 (EBA III, unpainted and unburnished); 217–218 (MBA, unpainted and unburnished).
- 6 Gauss and Kiriati 2011, 49 table 13 (inclusions visible on surface).
- 7 Gauss and Kiriati 2011, 49 table 13 (inclusions visible in the fresh break).
- 8 On the range of variations of shoulder-handled bowls see in particular Rutter 1995, 354–376.
- 9 On the range of variations of tankards see in particular Rutter 1995, 281–307.
- 10 On the range of variations of wide-mouthed jars see in particular Rutter 1995, 442–454.
- 11 Kiriati *et al.* 2011, 131–134 (FG 1A brown amphibole, FG 1B green amphibole); Gauss and Kiriati 2011, 249.
- 12 On pot-marks see in particular Lindblom 2001; on the distribution of Aeginetan pottery see Rutter 1993, 777 fig. 12; Lindblom 2001, 42–44, 100–110; and Gauss and Kiriati, 2011, 241–247.
- 13 See Lindblom 2001, 112–116; Gauss and Kiriati 2011, 242–254; as well as Whitbread in the present volume.
- 14 The recent scientific analysis did not cover systematically the LBA pottery, as no appropriate pottery was available at the time of sampling. The characterisation of the LBA cooking ware fabric is the special focus of an INSTAP-funded research project by W. Gauss, E. Kiriati, M. Lindblom, B. Lis and J. Morrison.
- 15 See Gauss and Kiriati 2011, 178, 245–247 and nn. 968–973 on the distribution of Aeginetan cooking pots in the LBA (n. 966 referring to Dimini); see also Lis in the present volume, who discusses Aeginetan cooking pots found at Mitrou.
- 16 Regarding the distribution of Aeginetan pottery, see in particular Zerner 1986; Rutter 1993; Lindblom 2001; and the most recent summary by Gauss and Kiriati 2011, 241–247.
- 17 See Weilhartner 2012 with a summary and interpretation of the relevant sources. Weilhartner favours the reading *χυτρόπωλιν*, “pot-seller”, in contrast to the reading *χυτρόπολιν*, “town that produces cooking pots”, as sometimes found in recent studies; see also Weilhartner 2010, 91 no. 415, 270 no. 1200, 308 no. 1356 with a comprehensive list of these sources.
- 18 Klebinder-Gauss 2012, 89–90, 173–193 with contributions by Pentedeka *et al.* 2012, 106–115 and Weilhartner 2012. A first petrographic analysis was published by M. Farnsworth, who isolated among the cooking vessels from the Athenian Agora a characteristic fabric that she associated rightly with Aegina: Farnsworth 1964, 222–224, 226–227, nos. 2, 11, pls. 66, 67.
- 19 Klebinder-Gauss 2012, 89–90 “Macroscopic Group CMG 1” and Pentedeka *et al.* 2012, 106–115 “Red Fabric A and B”.
- 20 For this *chytra* see Klebinder-Gauss 2012, 173–174 no. 484, dated on stylistic grounds to the first half of the 7th century BC; see also *ibid.* no. 485 and Felten *et al.* 2007, 101 fig. 21 with more early examples. Other early Aeginetan *chytrai* were found in Athens, as *e.g.* examples from the Athenian Agora from the third (see Rotroff’s contribution in the present volume with n. 16) and fourth quarters of the 7th century BC (Brann 1962, 55 no. 210, pl. 11; for its Aeginetan origin see Klebinder-Gauss and Strack in prep.) and from a context dated to the 7th century BC in the Athenian Kerameikos (Kühler 1954, 256 inv. 355, pl. 155; for its Aeginetan origin see Klebinder-Gauss 2012, 182 with n. 807). For kind permission to see these pieces we thank J. Camp and the Agora Team as well as J. Stroszeck and the Kerameikos-Team.
- 21 On the lack of evidence in the Geometric period see Jarosch-Reinholdt 2009, 15.
- 22 See above note 15.
- 23 For the common-type *chytra* in Fig. 6.6 see Klebinder-Gauss 2012, 39–40, no. 50, pl. 5.75. For the lidded *chytra* in Fig. 6.7 see Sparkes and Talcott 1970, pl. 94, no. 1951; for the brazier in Fig. 6.8 see Sparkes and Talcott 1970, pl. 98, no. 2030; for the Aeginetan origin of these two examples see Klebinder-Gauss and Strack in prep. For further examples and for the development of the various shapes of Aeginetan cooking ware see Klebinder-Gauss 2012, 182–193.
- 24 Klebinder-Gauss 2012, 177; Klebinder-Gauss and Strack in prep. on the Aeginetan origin of the early examples of lidded *chytrai*, *lopades* and braziers from the Athenian Agora.
- 25 See Klebinder-Gauss 2012, 90–92 “Macroscopic Groups CMG2-4” and Pentedeka *et al.* 2012, 115–124 “Buff fabrics A and B”.
- 26 For these dramatic events in the Aeginetan history see Weilhartner 2008; for the strong impact of these developments on the Aeginetan cooking ware production see Klebinder-Gauss and Strack in press.
- 27 On the relevant written sources see Weilhartner 2010, 366.
- 28 Klebinder-Gauss 2012, 204–206 nos. 488–505.
- 29 For the small round-bottomed *chytra* in Fig. 6.9 see Klebinder-Gauss 2012, 71, no. 363, pls. 34, 100; see *ibid.* nos. 50, 51 for other small *chytrai* with regular wheel marks on the interior wall. In many cases, especially with larger vessels, wheel marks are visible only at the shoulder and neck, as the careful scraping of the interior surface has left no traces of other processes; a manufacture on the wheel also of the lower body can only be hypothesised. Continuous wheel marks can also be observed

on the whole interior wall of jars and amphoriskoi, when not smoothed by scraping. Regarding the use of the wheel in Aeginetan cooking ware production see Klebinder-Gauss 2012, 178–180 and Klebinder-Gauss and Strack in press; for the manufacture of round-bottomed vessels on the wheel see e.g. Rice 1987, 129, 132–133.

- 30 Our studies, however, did not provide evidence of a use of the “beater-and-anvil” method for the Aeginetan cooking ware, as was assumed by Farnsworth 1964, 225.
- 31 For the different techniques used with Aeginetan cooking ware, see Klebinder-Gauss 2012, 178–182 and Klebinder-Gauss and Strack in press; see also further below and note 43.
- 32 For questions of standardisation and specialisation see e.g. Rice 1991; Tite 1999, 191–194.
- 33 E.g. Athenian Agora: Farnsworth 1964, 222–225; Klebinder-Gauss and Strack in prep.; see above note 20 for some early Aeginetan imports at Athens. See also the contribution of Rotroff this volume on the high number of Aeginetan imports at the Athenian Agora during the 6th and 5th centuries BC. For a comprehensive analysis of the distribution of Aeginetan cooking ware beyond the island see Klebinder-Gauss 2012, 198.
- 34 E.g. Pease 1937, 304, 306 nos. 205, 212, 214, fig. 36. These pieces, which G. Klebinder-Gauss was able to see due to the kind help of G. Sanders and J. Tsounou-Herbst, are in our opinion Aeginetan.
- 35 For Aeginetan *chytrai* from Azoria see Haggis *et al.* 2011, 442 n. 26, 442, 447, 451, 454, 458, 460, 462, 466–447.
- 36 Tocra: e.g. Boardman and Hayes 1973, 58–61 nos. 2247–2252, fig. 24, pl. 31; Euesperides: e.g. Swift 2005.
- 37 For Histria see Alexandrescu 1978, 124 no. 816, pl. 71. We also would like to thank I. Bîrzescu for mentioning more examples from this site.
- 38 A. Quercia kindly called our attention to a presumably Aeginetan *chytra* from Incoronata: Orlandini and Castoldi 1997, 86 no. 15, figs 96, 256.
- 39 Lattara: Curé this volume, fig. 6.4; Curé 2010, 522 groupe 14, figs. 8.4; 11.24–26; 24.13–15. We would like to thank A. Curé for calling our attention to Aeginetan imports from this site.
- 40 See e.g. Figueira 1981, esp. 166–170, 264–283; Jennings 1990, esp. 5–33; Weilhartner 2008, 343–344; for the written sources on this subject see Weilhartner 2010, 384 s.v. “Wirtschaft und Handel”.
- 41 Klebinder-Gauss and Strack in press; see also Rotroff this volume.
- 42 For the various factors that might influence the production, use and import of certain cooking wares see e.g. I. Whitbread’s contribution in the present volume; on the influence of non-functional elements, such as social, ideological and cultural factors, on the production and consumption of pottery see also e.g. Rice 1987, 113; Loney 2000; Tite *et al.* 2001, 317, 322; Tite and Kilikoglou 2002, 4–5. A study on the consumption of Aeginetan versus Attic cooking ware is in preparation by Klebinder-Gauss and Strack; some of the following thoughts on the possible qualities of Aeginetan cooking ware are due to our discussions on this topic.
- 43 Characteristics of various materials and production techniques have been examined in laboratory analysis and ethnographic studies. For the thermal properties of different types of clay and temper, for the effects of smoothing, burnishing and wash, of thin walls and rounded shapes on the performance of cooking pots see e.g. Rice 1987, 227–240, 353–355, 367–369; Schiffer 1990, 377–379; Tite and Kilikoglou 2002, 1, 4; Tite *et al.* 2001; Pierce 2005; as well as the articles by Hein and Müller *et al.* in the present volume regarding heating efficiency; see also Whitbread’s contribution in the present volume on the various factors that can affect the thermal and physical properties of cooking ware, and on their interactions.

- 44 See Whitbread’s contribution in the present volume on tempering with volcanic material.

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TRUE GRIT: PRODUCTION AND EXCHANGE OF COOKING WARES IN THE 9TH-CENTURY BC AEGEAN

James Whitley and Marie-Claude Boileau

Introduction

It is often said that coarse wares in general, and kitchen pottery in particular, have been neglected in the study of the ancient Aegean. Like any such generalisations, this one must be taken with a pinch of salt (or perhaps grit). In Crete, coarse wares and cooking wares have certainly not been neglected by survey archaeologists interested in the Cretan Bronze and Iron Ages. The slashed or thumb-impressed leg from the characteristic Cretan tripod cooking vessel has become something of a type fossil for upland sites dating to the very end of the Bronze Age and beginning of the Iron Age (Late Minoan IIIC/LMIIIC).¹ It is, of course, true that ceramic experts of an earlier generation who studied the Knossian sequence did concentrate their efforts on understanding the sequence of painted fine wares. But neither Bronze Age experts (such as Mervyn Popham) nor Iron Age specialists (such as Nicolas Coldstream) neglected kitchen pottery. Indeed, Coldstream was careful to take note of “representative” sherds of cooking vessels.² One of the things that Popham, Coldstream and others have established is that the two principal “Minoan” cooking shapes found at Knossos, the tripod cooking jug and the baking tray, “survive from Late Minoan times into the early Greek repertoire without much change” (Coldstream 2001, 63). This statement, if anything, underestimates the degree of continuity in shape (and so perhaps cooking practice) between the Bronze and Iron Ages – tripod cooking jugs can be traced back to the Early Minoan II period (if not earlier) in Knossos.³ For Coldstream, the major discontinuity in the Knossian sequence occurs much later, after the “Archaic gap” (c. 600–525 BC),⁴ where the tripod cooking jug has been

replaced by two characteristically “Hellenic” shapes, the *chytra* and the *lopas* (Coldstream and Eiring 2001, 87). This is where our project comes in. For, though cooking wares have not been neglected, petrographic examination of Iron Age coarse wares has lagged behind comparable studies of Cretan Bronze Age material. Where scientific studies have taken place, they have concentrated on chemical analysis of the fine wares. This work is of course invaluable in determining the origin of much imported pottery, and Knossos’ links with the wider Mediterranean world in the Early Iron Age.⁵ But it also tends to perpetuate the belief that Mediterranean connections are best understood through the study of fine wares, fine wares which indelibly bear the marks of their origins. Coarse wares in general, and kitchen pottery in particular, are assumed (by default) to be local.

Recent studies of coarse and kitchen wares in the Eastern Mediterranean have done much to undermine these general assumptions and demonstrate the range of questions to which the study of kitchen pottery might be relevant.⁶ The comparative study of Iron Age coarse wares from Knossos and Thronos Kephala (ancient Sybrita), undertaken by Marie-Claude Boileau, Anna Lucia D’Agata and James Whitley, treated coarse wares as being of equal intrinsic interest to fine wares.⁷ It was not, however, primarily conceived as a study of kitchen wares as such, but rather as a general study of the production and consumption of coarse wares in Northern and West-Central Crete. The significance of kitchen wares only emerged in the course of our study.

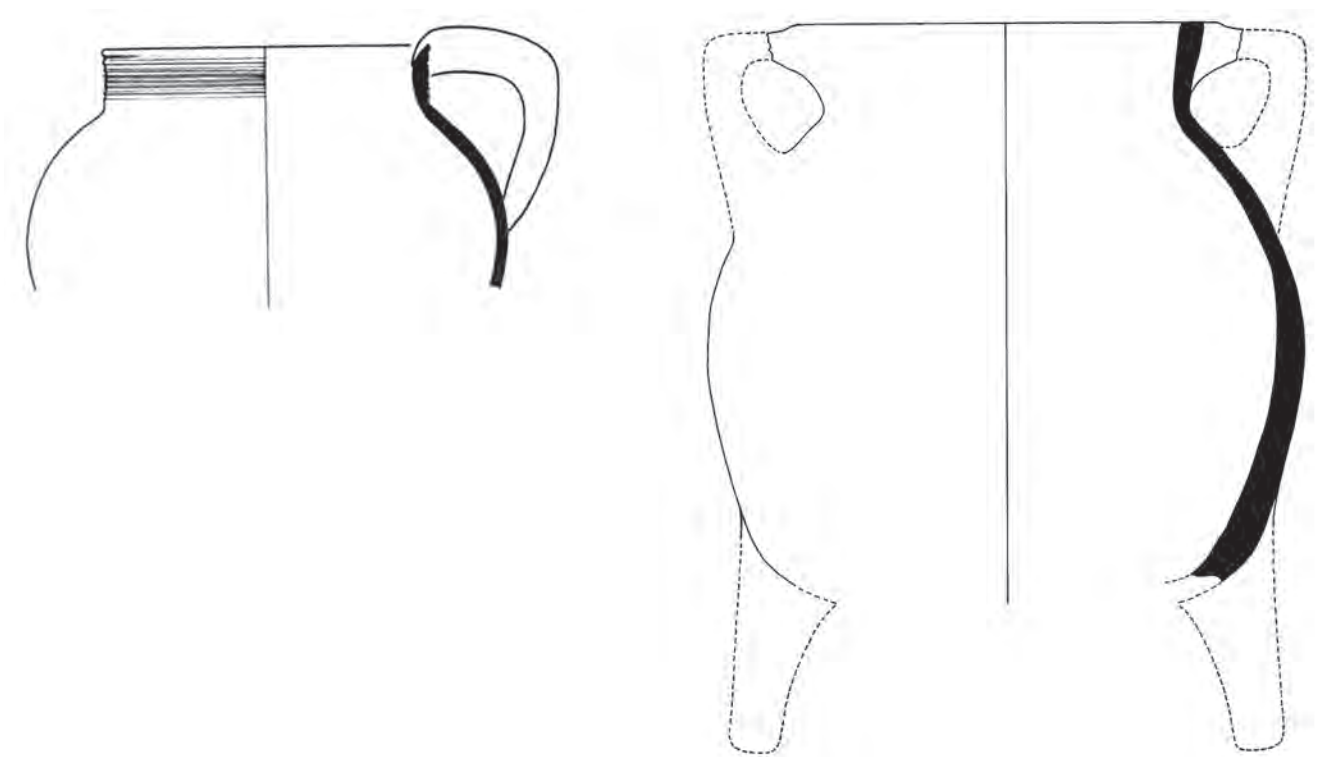


Figure 7.1. Drawing showing a cooking jug (Unexplored Mansion well 12.23, LO, see Coldstream and Sackett 1978, 47), left, and a tripod cooking vessel (South West houses D.17, EPG, see Coldstream and Macdonald 1997, 210–211), right, the two main cooking shapes in EIA Knossos. Image courtesy of the British School at Athens.

Kitchen pottery at Knossos: context and use

Kitchen pottery is found widely in domestic deposits in Iron Age Knossos. Cooking pots take various forms – the tripod cooking jug, the cooking jar and the baking tray (Fig. 7.1). They have been found all over the site, in deposits dating from the Subminoan to the Late Orientalising periods. Of course, rarely do such deposits tell us something directly about how pottery was used for cooking: with the possible exception of the Protogeometric floor under the Villa Dionysos, floor levels with cooking debris have not been found.⁸ But kitchen pottery is nearly ubiquitous in secondary deposits such as wells and fills. Not much can be inferred from these secondary contexts. The distribution of kitchen pottery is another matter, since it is consistent with inferences about the size of the Early Iron Age (EIA) settlement, as inferred from the recent “Knossos Urban Landscape Project”.⁹ Moving from north to south, EIA kitchen pottery has turned up in the Teke Cemetery (KS 47), the North Cemetery (KS 62), in the Protogeometric floor beneath the Villa Dionysos (KS 114), in the Mavro Spelio Cemetery (KS 251), in the Little Palace North (KS 185/186), in the Unexplored Mansion (KS 186), in deposits

by the Royal Road (KS 214/215), in the Northwest Quarter of the Palace (the Geometrical Well) (KS 222), in the Southwest Houses (unnumbered, but just southwest of the Palace) and in the Stopford Well by the Vlychia stream (KS 201).¹⁰ Though the vast majority of kitchen wares come from “domestic” deposits, nine (out of 93 known) have been found in EIA tombs in the Teke, North and Mavro Spelio Cemeteries, apparently the result of deliberate deposition.¹¹ Table 7.1 lists all known catalogued examples of kitchen pottery known from previous publications. In all, 74 EIA Subminoan–Late Orientalising (SM–LO) vessels have been catalogued, of which 23 were used in our original petrographic study, as well as ten later examples from Late Archaic and Classical deposits.¹² For the purposes of this paper, finds have been grouped into seven periods (Subminoan/Early Protogeometric [SM/EPG], Protogeometric [PG], Protogeometric B and Early Geometric [PGB/EG], Middle and Late Geometric [MG/LG] and Early and Late Orientalising [EO/LO], Late Archaic [LAR] and Classical [CI]), employing the chronological scheme established by J. K. Brock and refined by Nicolas Coldstream.¹³ The ten Late Archaic and Classical cooking wares that have been studied and catalogued by Coldstream and Callaghan have also been included. Table 7.2 breaks

Table 7.1. Table of all known cooking wares from Knossos dating from Subminoan to Classical times, arranged by area (from north to south).

No.	Reference	Deposit number	Deposit	Type of vessel	Part of vessel	Date (typological)	Date (calendar years BC)	Boileau and Whitley 2010 number	clay	Boileau and Whitley fabric group
1	Coldstream and Catling 1996, 22 fig. 62, pl. 60	KNC G.141	KNC tomb G	Coarse tripod basin		PGB/EG	850–800	n/a	"Gritty red clay, some mica"	
2	Coldstream and Catling 1996, 29 fig. 65, pl. 66	KNC J.46	KNC tomb J	Tripod cooking pot		PG	950–850	n/a		
3	Coldstream and Catling 1996, 134 fig. 102, pl. 134	KNC 100.9	KNC tomb 100	Coarse tripod jug		PG/EG	900–800	n/a	"Gritty micaceous red clay"	
4	Coldstream and Catling 1996, 197 fig. 125, pl.185	KNC 207.25	KNC tomb 207	Tripod cooking jug		PG	950–850	201		3a
5	Coldstream and Catling 1996, 216 fig. 132, pl. 206	KNC 219.67	KNC tomb 219	Tripod cooking jug		MG/LG	800–700	n/a	"Gritty and micaceous red clay"	
6	Coldstream and Catling 1996, 264 fig. 146, pl. 239	KNC 292.78	KNC tomb 292	Coarse tripod jug		MG/LG	800–700	n/a		
7	Coldstream and Catling 1996, 281 fig. 151, pl. 257	KNC 306.18	KNC tomb 306	Miniature tripod cauldron		MG/LG	800–700	n/a		
8	Coldstream and Hatzaki 2003, 289	B.24	Villa Dionysus B	Cooking jug	Rim, body and handle	PG	950–850	15		7
9	Coldstream and Hatzaki 2003, 289	B.25	Villa Dionysus B	Tripod cooking jug	base	PG	950–850	16		7
10	Coldstream and Hatzaki 2003, 289	B.26	Villa Dionysus B	Tripod cooking pot	base	PG	950–850	n/a		
11	Boileau and Whitley 2010	Upper PG floor, level 9	Villa Dionysus	Plain cooking pot		PG	950–850	28		3a
12	Boileau and Whitley 2010	Upper PG floor, level 14.36	Villa Dionysus	Plain cooking pot		PG	950–850	32		loner
13	Boileau and Whitley 2010	Upper PG floor, level 15.38	Villa Dionysus	Plain cooking pot		PG	950–850	34		3a
14	Boileau and Whitley 2010	Upper PG floor, level 15.38	Villa Dionysus	Plain cooking pot		PG	950–850	35		3a
15	Boileau and Whitley 2010	Upper PG floor, level 6.14	Villa Dionysus	Plain cooking pot		PG	950–850	42		loner
16	Coldstream and Hatzaki 2003, 292	C.31	Villa Dionysus C	Cooking jug	Rim, body and handle	PG	950–850	10		2a
17	Coldstream and Hatzaki 2003, 292	C.32	Villa Dionysus C	Cooking jar	Rim and body	PG	950–850	11		2a
18	Coldstream and Hatzaki 2003, 304	Sup.44	Villa Dionysus Sup.	Cooking jug	Rim and body	EO	700–650	n/a		
19	Coldstream and Hatzaki 2003, 304	Sup.45	Villa Dionysus Sup.	Cooking jug	Rim and shoulder	O	700–620	n/a		
20	Coldstream 2000, 292	N.3	Mavro Spelio T.4	Cooking pot		EO	700–650	97		loner

21	Coldstream 2000, 292	N.15	Mavro Spelio T.4	Cooking jug	Rim and shoulder	O	700–620	99		3b
22	Hatzaki et al. 2008, 247	B5.20	LPN	Cooking pot		G	800–700	161		4
23	Hatzaki et al. 2008, 245	B4.21	LPN	Coarse jar - for cooking?		G	800–700	154		7
24	Hatzaki et al. 2008, 245	B4.22	LPN	Cooking jug	Rim and body	G	800–700	156		3a
25	Hatzaki et al. 2008, 248	B6.9	LPN	Cooking jug	Shoulder	O	700–620	167		3b
26	Hatzaki et al. 2008, 250	B6.31	LPN	Cooking jug	wall	O	700–620	163		4
27	Popham 1992, 65, pl. 48c	Main 5	UM SM Main	Cooking pot	Rim	SM	1025–950	n/a		
28	Popham 1992, 65, pl. 48c	Main 6	UM SM Main	Cooking pot	Handle	SM	1025–950	n/a		
29	Popham 1992, 65, pl. 48c	Main 9	UM SM Main	Cooking pot	Handle	SM	1025–950	n/a		
30	Popham 1992, 65, pl. 48c	Main 10	UM SM Main	Cooking pot	Handle and body	SM	1025–950	n/a		
31	Popham 1992, 65, pl. 48c	Main 11	UM SM Main	Cooking pot	Handle	SM	1025–950	n/a		
32	Popham 1992, 65, pl. 48c	Main 12	UM SM Main	Tripod cooking pot	Leg	SM	1025–950	n/a		
33	Popham 1992, 65, pl. 48c	Main 13	UM SM Main	Tripod cooking pot	Leg	SM	1025–950	n/a		
34	Popham 1992, 65, pl. 48c	Main 15	UM SM Main	Tripod cooking pot	Leg	SM	1025–950	n/a		
35	Popham 1992, 65, pl. 48c	Main 16	UM SM Main	Cooking pot	Handle and body	SM	1025–950	n/a		
36	Popham 1992, 65, pl. 48c	Main 17	UM SM Main	Tripod cooking pot	Leg	SM	1025–950	n/a		
37	Popham 1992, 65, pl. 48d	Main 5bis	UM SM Main	Tripod cooking pot	Leg	SM	1025–950	n/a		
38	Coldstream 1992, 69	GB 37	UM GB	Cooking jug	Rim to belly	LPG/PGB	875–800	n/a		
39	Coldstream 1992, 69	GB 38	UM GB	Cooking jar	Rim	LPG/PGB	875–800	n/a	"Hard red clay, gritty and micaceous"	
40	Coldstream 1992, 70	GC 12	UM GC	Cooking jug	Rim to belly with handles	PGB/EG	850–800	n/a		
41	Coldstream 1992, 72	GD 32	UM GD	Tripod cooking jug	Body	MG	800–750	n/a		
42	Coldstream 1992, 73	GE 25	UM GE	Cooking jug	Rim to belly	LG	750–700	n/a		
43	Coldstream 1992, 75	GF 24	UM GF	Cooking jug	Rim to lower body	O	700–650	n/a		
44	Coldstream 1992, 77	GG 57	UM GG	Cooking vessel	wall	MG-LG	800–700	n/a		
45	Coldstream and Sackett 1978, 47	1.23	TP/68	Cooking jug	Rim to belly	EO	700–650	n/a		
46	Coldstream and Sackett 1978, 47	1.24	TP/68	Casserole	Rim to belly with handles	EO	700–650	n/a		

47	Coldstream and Sackett 1978, 47	2.24	UM well 12	Cooking jug	whole	EO	700–650	n/a	"Gritty and micaceous"	
48	Callaghan 1992, 93	H5 10	UM H5	Cooking tray		CI	480–400	n/a		
49	Callaghan 1992, 93	H5 11	UM H5	Small lopas		CI	480–400	n/a	Brick red fabric, granular"	
49	Callaghan 1992, 93	H5 11	UM H5	Small lopas		CI	480–400	n/a	"Brick red fabric, granular"	
50	Callaghan 1992, 97	H10 17	UM H10	Chytra	Rim to lower body	CI	360–300	n/a		
51	Callaghan 1992, 97	H10 18	UM H10	Cooking dish	Rim, handle and body	CI	360–300	n/a		
52	Coldstream 1972, 70, pl. 15	A.31	Royal Road A	Cooking pot (tripod?)	rim	SM/EPG	950–900	n/a		
53	Coldstream 1972, 70, pl. 15	A.32	Royal Road A	Cooking pot (tripod?)	wall	SM/EPG	950–900	n/a		
54	Coldstream 1972, 70, pl. 15	A.33	Royal Road A	Baking tray	fragment	SM/EPG	950–900	n/a		
55	Coldstream 1972, 70, pl. 15	A.34	Royal Road A	Cooking pot (tripod?)	base	SM/EPG	950–900	n/a		
56	Coldstream 1972, 73, pl.17	B.44	Royal Road B	Cooking pot (tripod?)	rim	EPG/MPG	925–875	n/a		
57	Coldstream 1972, 72, pl.17	B.45	Royal Road B	Cooking pot (tripod?)	rim	EPG/MPG	925–875	n/a		
58	Coldstream 1972, 86-87	F.27	Road Trials/Well	Tripod cooking pot	whole	LG/EO	750–650	n/a		
59	Coldstream 1972, 86-87	F.28	Road Trials/Well	Cooking pot	Rim and body	LG/EO	750/650	n/a		
60	Coldstream 1972, 86-87	F.29	Road Trials/Well	Cooking pot	Rim and handle	LG/EO	750/650	n/a		
61	Coldstream 1972, 98	G.131	RR F 21 pit	Cooking pot	Rim and handle	LG/EO	750/650	n/a		
62	Coldstream 1972, 98	G.132	RR FG 3	Cooking pot	Rim and wall	LG/EO	750/650	n/a		
63	Coldstream 1972, 98	G.134	RR BC 10	Cooking pot	Handle and body	LG/EO	750/650	n/a		
64	Coldstream 1973, 60	L.114	RR/H/60	Chytra	Rim to near base	LAr	525–480	n/a		
65	Coldstream 1973, 60	L.115	RR/H/60	Casserole	Rim and body	LAr	525–480	n/a		
66	Coldstream 1973, 60	L.116	RR/H/60	Cooking dish	whole	LAr	525–480	n/a		
67	Coldstream 1999, 333	R.38	Royal Road F 8	Cooking jar	Rim and handle	CI	480–300	n/a	hard gritty red clay	
68	Coldstream 1999, 333	R.39	Royal Road F 8	Casserole	Rim and handle	CI	325–300	n/a	hard gritty red clay	
69	Coldstream 1999, 333	R.40	Royal Road L 17	Casserole	Rim and handle	CI	325–300	n/a	hard gritty red clay	
70	Coldstream 2000, 273	E.38	NW Quarter: "Theatral"	Cooking jug	Rim and shoulder	O	700–600	n/a		

71	Coldstream 2000, 284	H.45	NW Quarter: G Well	Cooking jug	Rim and body	M-LG	770–700	91		4
72	Coldstream 2000, 284	H.46	NW Quarter: G Well	Cooking jug	Rim to base	LG	750–700	93		4
73	Coldstream 2000, 284	H.47	NW Quarter: G Well	Cooking jug	Rim and wall	LG	750–700	n/a		
74	Coldstream 2000, 284	H.48	NW Quarter: G Well	Cooking jar	Rim and body	G	800–700	92		4
75	Boileau and Whitley 2010	1744	NW Quarter: G Well	Plain cooking pot		G	800–700	102		7
76	Boileau and Whitley 2010	1745	NW Quarter: G Well	Plain cooking tray		G	800–700	112		loner
77	Boileau and Whitley 2010	1745	NW Quarter: G Well	Plain cooking pot		G	800–700	113		4
78	Boileau and Whitley 2010	1746	NW Quarter: G Well	Plain cooking pot		G	800–700	124		3a
79	Boileau and Whitley 2010	1495	NW Quarter: G Well	Plain cooking pot		G	800–700	139		4
80	Coldstream and Macdonald 1997, 204	A.29	SW houses A	Cooking pot	Rim and shoulder	SM/EPG	950–900	50		3a
81	Coldstream and Macdonald 1997, 208	B.39	SW houses B	Baking tray	whole	EPG	925–900	54		3a
82	Coldstream and Macdonald 1997, 210	D.17	SW houses D	Tripod cooking pot	whole	EPG	925–900	n/a		
83	Coldstream and Macdonald 1997, 213	E.22	SW houses E	Cooking pot	fragment	EPG	925–900	n/a		
84	Coldstream and Macdonald 1997, 222	H38	SW houses	Baking tray		E/MPG	950–875	63		2a
85	Coldstream and Macdonald 1997, 215	F.23	SW houses F	Cooking pot	Rim frs	EO	700–650	81		4
86	Coldstream and Macdonald 1997, 217	G.41	SW houses	Cooking pot		EO	700–650	77		loner
87	Coldstream and Macdonald 1997, 217	G.43	SW houses	Cooking pot		EO	700–650	75		4
88	Coldstream and Macdonald 1997, 220	H.32	SW houses H	Cooking pot	Rim frs	EO/LO	700–620	71		3a
89	Coldstream and Macdonald 1997, 220	H.33	SW houses H	Cooking pot	Wall	EO/LO	700–620	n/a		
90	Coldstream and Macdonald 1997, 220	H.34	SW houses H	Cooking pot	Rim frs	EO/LO	700–620	72		4
91	Coldstream and Macdonald 1997, 220	H.36	SW houses	Plain basin		O	700–600	73		4
92	Coldstream 2000a, 265	A.18	SW Palace	Cooking jug	Rim frs	LG/EO	750–650	n/a		
93	Coldstream 1960, 162	St.I.33	Stopford Well, lower	Cooking pot	fragment	PG	900–800	n/a		
94	Coldstream 1960, 170	St.u.114	Stopford well, upper	Cooking pot	fragment	LG/EO	750–650	n/a		

Table 7.2. Number of cooking vessels by period (Subminoan to Classical), after information supplied in Table 7.1.

	SM/EPG	PG	PGB/EG	MG/LG	EO/LO	LAr	CL	Total
Catalogued	19	11	5	17	22	3	7	84
Uncatalogued (but in Boileau and Whitley 2010)		5		5				10
Total	19	16	5	22	22	3	7	94

Table 7.3. Breakdown of numbers of vessels (by function) in the two Protogeometric floors from the Villa Dionysus (information from Coldstream and Hatzaki 2003; Boileau and Whitley 2010).

	Drinking vessels	Other dining	Other finewares	Cooking vessels	Coarse wares (storage)	Plain wares	Other objects	Total
Lower PG deposit	8	17	9	4	1	0	4	39
Upper PG deposit	7	18	10	6	5	5	1	52
Total	15	35	19	10	6	5	5	91

this information down by period, adding the previously uncatalogued cooking wares included in our study (Boileau and Whitley 2010).

The chronological spread of cooking wares over the various periods is very uneven. Even if we allow for a considerable degree of stratigraphic and chronological uncertainty, and consider that some periods (especially the late 9th century BC, the PGB/EG phase) must have been much shorter than others, the distribution seems skewed. There are very few Archaic or Classical cooking vessels, and there ought to be at least double the number of sherds associated with late-9th-century BC deposits than we actually possess (if, that is, we assume that the proportions of cooking pottery to other kinds of wares should remain constant). The second, and perhaps most obvious, inference from these tabulations is that specialised kitchen pottery was being widely used in a clearly domestic or household setting. So much, so obvious, one might say. But this also implies that the wider community of EIA Knossos was made up of households, presumably based on some principle of kinship (families). Again, so far, so obvious, were it not for much later literary evidence that claims that Cretans, of all ages and sexes, ate communally, in *syssitia*.¹⁴ Donald Haggis and Peggy Mook have looked into how storage, cooking and consumption practices might have been linked at Archaic Azoria, where communal dining might have taken place (Haggis *et al.* 2004; 2007; 2011). At present, it is not possible to explore these issues in detail at Knossos. There is only one deposit that provides any insight into the use context of kitchen pottery, and that is the two PG floor levels beneath the Villa Dionysos (see Table 7.3).

These figures suggest that cooking vessels in domestic deposits on average amount to a little more than 10%. Of

course, without going through each individual deposit, it is impossible to be certain, but there seems to have been a systematic under-recording of kitchen vessels, a bias partly corrected by the selection criteria for our study.¹⁵

Petrographic study

Our study of Knossos was based on a sample of 210 sherds taken from six different (two funerary, four domestic) deposits of Early Iron Age date within the Knossos area (the Southwest Houses, the “Geometrical Well”, north of the Palace, the Little Palace North, the Villa Dionysos, the Mavro Spelio Cemetery, and the North Cemetery).¹⁶

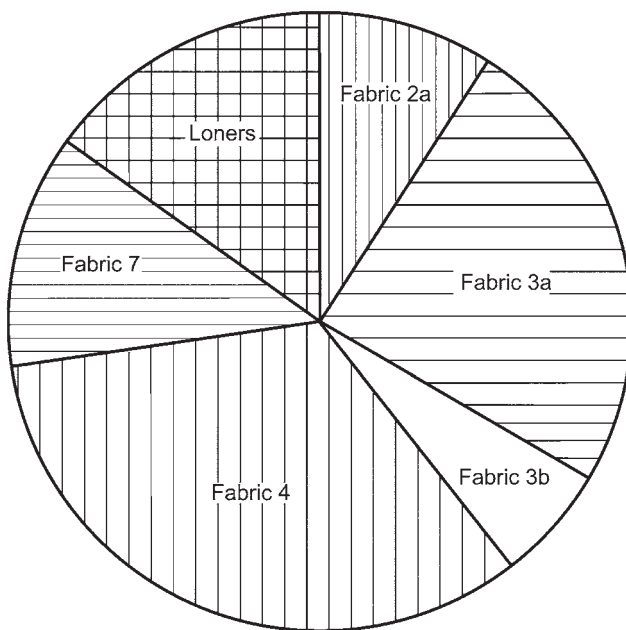
Petrographic examination of the samples by Marie-Claude Boileau undertaken at the Fitch Laboratory managed to isolate seven fabric groups (groups 1, 2, 3, 4, 5, 6 and 7). Fabric group 1 is a coarse-grained orange fabric with phyllite-quartzite inclusions, used mainly for storage pithoi or for other domestic purposes. Fabric 2 is a coarse-grained fabric with siltstone, a subclass of which (2a) is sometimes used for cooking vessels. Fabric 3 (subdivided into 3a and 3b) is a coarse-grained fabric with sedimentary, metamorphic and igneous non-plastics, used for storage, domestic purposes and sometimes as a cooking ware. Fabric 5 is a coarse-grained fabric with grey siltstone, used mainly for storage vessels in PG times. Fabric 6 is the main semi-fine fabric used in Early Iron Age Knossos for the manufacture of the larger fine ware vessels, in particularly the painted funerary urns (pithoi). Fabrics 4 and 7 are the micaceous “gritty” fabrics which form the main topic of discussion of this paper. These seven fabric groups accounted for 188 out of the 210 sherds, that is 89.5% of

Table 7.4. The fabrics used in Knossian EIA cooking wares, as sampled and analysed by Boileau and Whitley 2010.

	Fabric 2a	Fabric 3a	Fabric 3b	Fabric 4	Fabric 7	Loners	Totals
SM/EPG	63	50	-	-	-	-	2
PG	10, 11	28, 34, 35, 201	-	-	15, 16	32, 42	10
PGB/EG	-	-	-	-	-	-	0
MG/LG	-	124, 156	-	91, 92, 93, 113, 139, 161	102, 154	112	11
EO/LO		71	99, 167	72, 73, 75, 81, 163	-	77, 97	10
Totals	3	8	2	11	4	5	33

Table 7.5. The relationship of fabrics to function (information from Boileau and Whitley 2010).

Fabric groups	Storage	Domestic	Cooking	Painted pithoi	Other	Total
Fabric 1	10	9	0	0	5	24
Fabric 2a	1	4	3	0	1	9
Fabric 2b	4	0	0	1	0	5
Fabric 3	3	4	10	0	1	18
Fabric 4	0	1	10	1	2	14
Fabric 5	4	0	0	0	0	4
Fabric 6	1	9	0	15	85	110
Fabric 7	0	0	4	0	0	4
Total	23	27	27	17	94	188



Proportion of cooking wares by fabric (n = 33)

Figure 7.2. Pie chart of the fabrics used in Knossian EIA cooking wares (n = 33), based on the information given in Table 7.4 (see also Boileau and Whitley 2010).

the sample. In addition there were five petrographic pairs and 12 petrographic loners.¹⁷ Cooking wares comprised 33 out of the 210 sherds sampled, that is they represented 15.7% of the total sample – enough, that is, to draw some inferences of some statistical validity (see Table 7.4).

Fig. 7.2 displays these results in a pie chart. The first point to notice is that there is a great variety of cooking fabrics. Four out of the seven fabric groups were used, at one time or another, for cooking purposes. If we separate out fabric groups 2 and 3 into their two subgroups, this figure rises to five out of a total of nine fabrics; and if we factor the petrographic loners into the equation, we have a possible total of ten cooking fabrics.

Few of these fabrics seem to have been specialised cooking fabrics. Fabric 2a, 3a and 3b were also used for a range of storage vessels, and for other domestic wares (see Table 7.5). Only fabric 7 is used exclusively for cooking. Given that cooking requires fabrics with certain, very specific behavioural properties – the vessels have both to withstand “thermal shock” and to have walls thin enough for the heat of the fire effectively to cook the food (Moody *et al.* 2003, 80–81) – this incomplete specialisation in cooking fabrics may be worth closer examination in the future.

But perhaps this is not the biggest surprise. One would think that cooking wares, being plain, functional household vessels, would be both manufactured and consumed

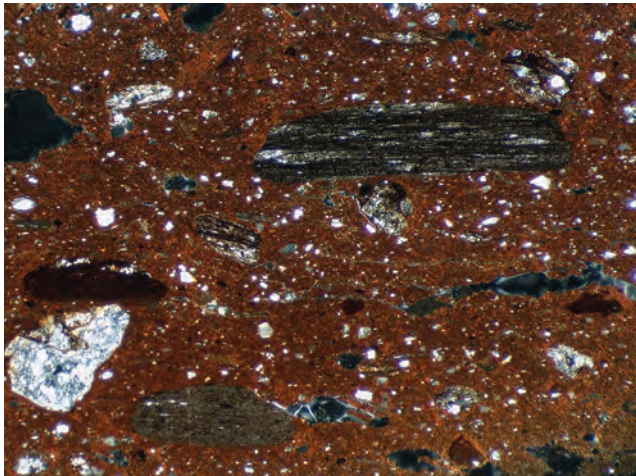


Figure 7.3. Thin section of fabric group 4 (sherd 92) cooking pot from the North Quarter Geometric well (originally published in Coldstream 2000, 284 H.48) (field of view 5.9 mm). Image courtesy of the British School at Athens.

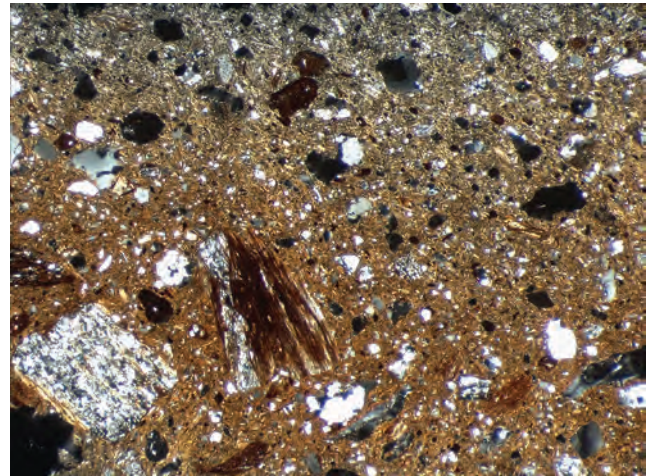


Figure 7.4. Thin section of fabric group 7 (sherd 15), a cooking pot from the Lower PG deposit in the Villa Dionysos (originally catalogued in Coldstream and Hatzaki 2003, 289 B.25) (field of view 5.9 mm). Image courtesy of the British School at Athens.

locally. Indeed the fact that a variety of fabrics were used for cooking vessels *might* be employed as an argument in favour of their being produced domestically, as part of a “household unit of production”, where each household favours a slightly different cooking fabric, rather than their being the products of specialist potters. Nothing of what we know ethnographically about the production of cooking vessels (see Spathari-Begliti 1992), however, suggests that their production was any less specialised than that of other wares. But even if “household production” is unlikely, the use of local clays to make such quintessentially domestic products as kitchen pottery might be thought to be the “default setting” for Knossians. After all, the local geology of the North Central Crete is full of the right kind of rocks from which to make cooking vessels, vessels which would fit very well into what has been called the Cretan “phyllite/quartzite series”.¹⁸ Even though the right kind of low-grade metamorphic rocks are not found within a 5 km radius of Knossos, they can be found in the Archanes area (Jones 1986, 225–226) that is within North Central Crete. Furthermore, most Late Bronze Age Cretan cooking wares appear to have been produced and consumed locally – this at least seems to be the case in the mainly LMIIIC sites of Karphi and the Kavousi area.¹⁹ Local production and consumption of cooking wares is what we would expect from earlier studies of Iron Age deposits at Thronos Kephala. Here there is a coarse-grained red fabric with phyllite-quartzite inclusions (Sybrita fabric Group 2) which appears to have been used almost exclusively for cooking wares (D’Agata and Boileau 2009, 173–177). This fabric remained in use in Thronos Kephala throughout the Early Iron Age (from LMIIIC to EO). Its composition is

consistent with the local geology, and so it appears to be a locally produced and locally consumed cooking ware.

Localised production and consumption is moreover what we would expect for most EIA coarse and semi-fine wares found in Knossos. The vast majority of the 210 sherds in the original study (175, or 83.3% of the sample) used for storage, household consumption, burials or other purposes were both produced and consumed in North Central Crete (Boileau and Whitley 2010, 240). This model of localised production, however, is not consistent with our findings for Knossian cooking wares (Boileau and Whitley 2010, 231–238). Only 15 out of our 33 sherds (45.5%) sampled (those in fabrics 2a, 3a, 3b together with petrographic loners 112 and 97) appear to have been produced within North Central Crete. Three sherds (petrographic loners 77, 42 and 32) appear to have been made elsewhere on the island (that is they are Cretan, but not local). Slightly less than half of our sample (45.5%) – that is, the 15 sherds in fabrics 4 and 7 – however, appear both to be not only non-local but non-Cretan.

This view – that almost half the Knossian cooking wares come from elsewhere in the Mediterranean – is of course controversial, and requires some justification. To begin with, fabric 4 (Fig. 7.3): this is a coarse-grained red fabric with mica, feldspar and shimmer aggregates, used mainly (but not exclusively) for cooking vessels.²⁰ We would argue that it corresponds in large part to Nicolas Coldstream’s “gritty red micaceous ware”: a fabric “of metamorphic brick-red clay, highly micaceous and also containing a variety of small white and brown inclusions” (Coldstream 2001, 61). As many other scholars have noticed, there are a number of red micaceous wares to be found in EIA Crete.

Haggis and Mook's fabric XVI, identified in excavation and survey in the Kavousi/Mirabello area, is both red and micaceous, and was sometimes used for cooking vessels.²¹ Peter Day has suggested that this fabric is essentially the same as Coldstream's "gritty red micaceous ware" on the basis of his examination of KNC 285.132.²² Fabrics similar to our group 4 have turned up in West Crete (Chandler 2001), and a number of red micaceous sherds (not necessarily of Iron Age date) have turned up in the Pediada survey (E. Nodarou, personal communication). None of the macroscopic descriptions of these fabrics, however, exactly matches our fabric group 4. What distinguishes our group is not that it is red and micaceous, but that it is "gritty". It includes shimmer aggregates (see above) and volcanic elements such as twinned feldspar and quartz. Quartz aside, these elements are not consistent with the geology of Crete as we presently understand it, and indicate a volcanic source somewhere outside the island.

Fabric group 7 (Fig. 7.4) appears more heterogeneous (Boileau and Whitley 2010, 235, 252–253). It is a coarse-grained fabric with brown phyllite, quartzite and mica. Two out of the four sample sherds have shimmer aggregates, which would indicate a non-Cretan, volcanic clay source. That is, the source for both fabric groups 4 and 7 appears to be volcanic and non-Cretan. Both must then have been imported into Knossos. But from where?

The first possibility that springs to mind is one of the volcanic islands in the Cyclades (Naxos), or perhaps the Dodecanese (Nisyros). Unfortunately, an examination of Bronze Age Cycladic fabrics stored in the Fitch Laboratory could produce no exact matches either with our group 4 or group 7. It should be remembered, however, that the Fitch Laboratory's sample collection is not exhaustive, and has a more complete collection of Bronze Age fabrics as compared to Iron Age ones (Boileau and Whitley 2010, 234). So, even though the precise source cannot be identified, a Cycladic origin remains a strong possibility. In historic times, the Cycladic island of Siphnos specialised in the production of cooking wares, which were then widely exported (Spathari-Begliti 1992). Though Siphnos is not the source for our fabric groups 4 and/or 7, specialised production of Cycladic cooking wares which were then exported to Crete does seem a plausible model. It seems unlikely that such cooking wares could have been exported only to Crete, or to Knossos, so we would expect that they would turn up elsewhere in the Aegean.

There is only one problem with this interpretation. The earliest sherds in our fabric group 4 (sherds 169 and 190) are not cooking wares. They are, respectively, a fragment of a PGB painted bell-krater from the Little Palace North excavation (Hatzaki *et al.* 2008, 252 B7.11), and a PGB painted lid from tomb 283 in the North Cemetery (KNC 283.18; Coldstream and Catling 1996, 233, pl. 215; here Fig. 7.5).



Figure 7.5. Photo of KNC 283.18 (lid, top; our sample sherd 190) and KNC 283.52 (straight-sided coarseware pithos below). Originally published in Coldstream and Catling 1996, 233–235, pl. 215. Image courtesy of the British School at Athens.

These finds are, however, consistent with Coldstream's observation that the earliest vessels in the "gritty red micaceous ware" come in two shapes: the ribbed juglet with trefoil lip (Coldstream 2001, 61–63; Fig. 7.6) and the straight-sided pithos (Fig. 7.5). The ribbed juglet appears to be of Cypriot inspiration if not manufacture (Coldstream 1984). Several juglets of this type, such as KNC 285.132 and KNC 285.145 (Coldstream and Catling 1996, 248, pl. 228; Fig. 7.6) appear in Knossian tombs in late-9th-century BC funerary contexts from the Teke, North and Fortetsa Cemeteries.²³ The coarse straight-sided pithos, such as Knossos North Cemetery (KNC) 283.52 (into which our lid, 190 KNC 283.18 fits; see Fig. 7.5),²⁴ is even further removed from cooking wares. The shape, which usually turns up in fine wares, is the standard Knossian urn of the late 9th century BC, strongly associated with the curious Knossian phenomenon of "Protogeometric B" (Brock 1957, 143; cf. Coldstream 2001, 24–27). Such considerations led Coldstream to conclude that it was not the vessels (whether for cooking, for burial or for perfume) but the clay that was imported (Coldstream 2001, 61). Having imported the clay "wholesale" (in Coldstream's view), Knossian potters then shaped these vessels into appropriately Knossian shapes. While this hypothesis would explain the observed pattern, there is (as far as we know) no ethnographic or historical parallel for such trade in pre-prepared clays for pottery. And it strikes us as inherently unlikely that, if Knossian potters were responsible for these vessels, some mixing of local with imported clays would not have resulted. Such



Figure 7.6. Two trefoil-lipped juglets from the North Cemetery, KNC 285.132, left, and KNC 285.145, right, both of “gritty red micaceous ware”. Originally published in Coldstream and Catling 1996, 248, pl. 228. Image courtesy of the British School at Athens.

mixing would, in our view, have been an almost inevitable consequence of the importation of raw (if exotic) clay, as potters adapted the fabric to make the pot more “fit for purpose”. There is no positive evidence for the mixing of local and non-local clays. The petrographic analysis of sherds in fabric group 4 would suggest that, while this fabric (which shows signs of large brown porphyroclast rich in yellow mica and shimmer aggregates) (Boileau and Whitley 2010, 233, 248–249) is the result of mixing, it results from a mixing of two sources of non-Cretan clays, rather than a North Cretan with a non-Cretan clay. These observations render Coldstream’s hypothesis less plausible.

The important point is that the fabric group 4 was not, when it first appeared, a fabric used exclusively or even primarily for cooking vessels. None of the cooking wares we sampled that fall into fabric group 4 date to the 9th century BC. There are, to be sure, some cooking wares from the PGB/EG whose fabric description might lead us to suspect that they belong to Coldstream’s “gritty red micaceous ware” (and thus our group 4). Examples include GB.38 from the Unexplored Mansion (Coldstream 1992, 69), KNC G.141 (Coldstream and Catling 1996, 22 fig. 62, pl. 60), KNC 100.9 (Coldstream and Catling 1996, 134 fig. 102, pl. 134), and KNC 219.67 (Coldstream and Catling 1996, 216 fig. 132, pl. 206). But the earliest “gritty red micaceous vessels” are two Late Protogeometric/Protogeometric B clay tripods²⁵ from the North Cemetery, datable to around 850 BC. The first vessels made from fabric group 4 and found in Knossos were not cooking wares.²⁶ What then is the fabric’s significance? The fabric itself is very distinctive, and was noticed and commented upon by Brock, Coldstream and Callaghan. It seems that you can’t miss “True Grit” when you see it, even macroscopically! Is it then possible that the fabric itself had properties that were

appreciated, and ones that made them especially suitable (in social terms) for the production of perfume flasks, funerary urns and clay tripods? And why do the earliest examples of cooking wares in a “gritty red micaceous ware” (probably our fabric 4) turn up, not in domestic deposits, but in funerary ones? It is, for example, *apparently* counter-intuitive that the grave groups associated with coarse ware funerary urns in PGB are no poorer than those with elaborately painted fine ware vessels (Whitley 2004); that is, the wealthiest people are not buried in the most richly decorated pots. But this nonetheless appears to be the case. It would require a further project to examine the social and cultural dimensions of fabric use, and we cannot say anything further here. The pattern of use of fabric 4 does nonetheless suggest that when the fabric first appeared, it was not simply as a result of “trade” in products that were purely commodities.

Fabric 4’s appearance in PGB is part of a broader pattern in EIA Knossos. For it is at this time, around 850 BC, that Knossos experienced a whole range of innovations that seem to indicate widening contacts with the Mediterranean world. These innovations include the PGB style itself, a pottery style (in part at least) inspired by Near Eastern metalworking;²⁷ the appearance of new forms of metalworking in bronze (the Fortetsa quiver F.1568 and belt F.1569) and gold (the Khaniale Tekke jewellery), that led John Boardman (1967) to suggest that a guild of Syrian craftsmen was operating in Knossos from 850 BC;²⁸ and, from the West, a Sardinian askos (Vagnetti 1989). This broadening of Knossos’ connections, of which the appearance of vessels in fabric group 4 must be a part, should be seen as an early manifestation of that process, under way by the mid-9th century BC, of bringing the Mediterranean together – Ian Morris’ (2003) “Mediterraneanisation”.

The broader range of Mediterranean connections after, as opposed to before, 850 BC can be seen in our cooking wares. Before 850 BC, eight out of 12 (66.6%) of the cooking vessels were produced locally, with two coming from elsewhere in Crete, and two (those in fabric 7) coming from somewhere else in the Aegean (see Fig. 7.7). After 850 BC, seven out of 21 cooking vessels (33.3%) were produced and consumed locally and one came from elsewhere in Crete. The majority of cooking vessels dating from the early 8th century BC onwards (13 out of 21, those in fabrics 4 and 7) were imported from somewhere else in the Aegean (see Fig. 7.8). By this time, these pots must have been traded,²⁹ and traded primarily as finished products. This in turn suggests that they must be considered commodities (and not gifts), and the mechanism that brought them to Knossos was trade (and not exchange). Trade in cooking vessels is a hitherto neglected dimension of “Mediterraneanisation”. And it was not one without broader effects.

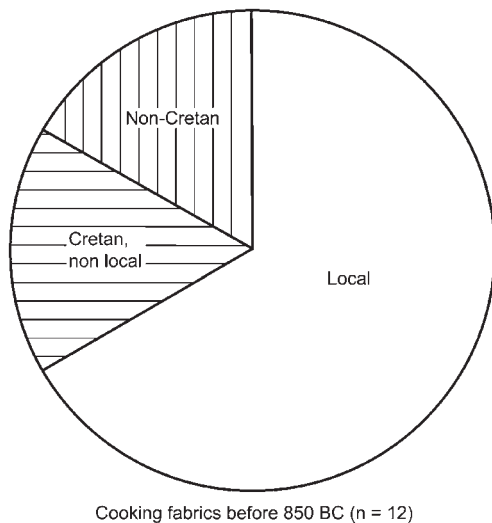


Figure 7.7. Pie chart of origin of cooking vessels found in EIA Knossos by fabric before 850 BC (n = 12).

Trade in cooking wares seems to have continued after the “Archaic gap” of 600–525 BC (Coldstream and Huxley 1999). Coldstream and Eiring (2001, 87) note that “red micaceous clay”, foreign to the Knossos area, was still being used for cooking ware in the years after 525 BC. None of these sherds have been sampled for our study. None the less, Coldstream (1999, 333) observes that the cooking jar R.38 and the casseroles R.39 and R.40 from Classical levels above the Royal Road were made of “hard, gritty red clay”, and a small Classical *lopas* from the Unexplored Mansion (H5.11) seems to have been made of “brick red fabric, granular” (Callaghan 1992, 93). Coldstream and Eiring (2001, 87) go on to argue that, while the cooking fabrics have stayed the same, the shapes have changed. The period after the Archaic gap sees the introduction of the *lopas*, or casserole, and the *chytra*, two “Hellenic” shapes with numerous parallels from the Greek mainland. But, on closer examination, this change is more apparent than real. To be sure, the *lopas* is a novelty; but the *chytra* is (we would argue), both in function and in shape, the successor of the tripod-less cooking jug that had been present in EIA Knossian deposits from Protogeometric times.³⁰ It is true also that no tripod cooking vessels are found in Late Archaic or Classical deposits at Knossos. But the tripod cooking vessel had been gradually falling out of use for some time. The last vessel with identifiable tripod legs is F.27 from the Road Trials, datable to around 700 BC (Coldstream 1972, 86–87). The “Archaic gap” has obscured what is a gradual change in cooking shapes (and so, presumably, cooking practices) that took place between the 8th and 5th centuries BC. In this change, cooking pots and cooking jugs gradually morph into the *chytra*.

Lastly, there is the question of how typical was Knossos

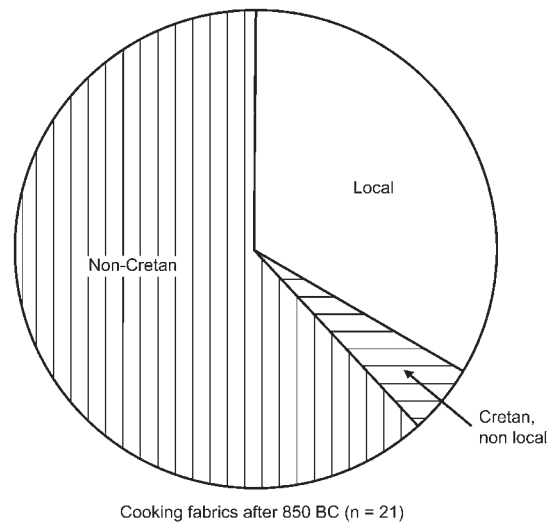


Figure 7.8. Pie chart of origin of cooking vessels found in EIA Knossos by fabric after 850 BC (n = 21).

in this respect. Was it the only community that came to rely principally on imported cooking wares? Thronos Kephala seems to have relied mainly on local products throughout the EIA (Boileau *et al.* 2009), and nothing similar to our fabric 4 has turned up at Eleftherna (Nodarou 2008). Micaceous cooking fabrics were used in the Kavousi/Azoria area throughout much of the Iron Age, but we do not yet know whether these are local products or imports. In North Central Crete, no site has been investigated as thoroughly as Knossos. Given the close connexions in the EIA between Knossos and Eltynia (Englezou 2004), it would not however be too surprising if fabrics 4 and 7 turn up there too.

Conclusions

To summarise, combining our data with earlier studies, and assuming that our fabric 4 and Coldstream’s “gritty red micaceous ware” are one and the same, there are four broad phases to Knossian patterns of production and consumption of cooking wares in the Early Iron Age and Archaic periods:

1. Before 850 BC, broadly local production and consumption, in shapes which derive clearly from the Bronze Age “Minoan” tradition. Cooking wares seem to be mostly in local fabrics (with the notable exceptions of nos. 15 and 16 in fabric 7).
2. 850–800 BC. The first identifiable imports in fabric 4 turn up in Knossos, initially appearing in shapes (tripods, straight-sided pithoi, trefoil-lipped juglets) unrelated to cooking and in largely non-domestic (particularly funerary) contexts.

3. 800–600 BC. Vessels in imported fabrics now take the form of cooking wares. Vessels in non-Cretan fabrics seem to be preferred to those in local ones. There is a gradual change in cooking shapes, with the gradual disappearance of the tripod cooking pot and tripod cooking jug. Other traditional shapes (the cooking jar, the baking tray) remain in use.
4. 525 BC onwards: this period witnesses the adoption of some non-Cretan shapes (the *lopas*) and the slow evolution of others (the cooking jug into the *chytra*), with the effect of making Knossian cooking practices more in line with those on mainland “Greek” sites. These shapes seem to have been largely imported vessels in non-Cretan fabrics.

Quite what could explain this process, and this progression, we do not know. And to better understand this process, and how Knossos fits in to broader patterns of “Mediterraneanisation” in the Iron Age, we need to undertake a follow-up project, that examines earlier “Minoan” cooking vessels from Knossos at one end and later, Late Archaic to Classical, vessels at the other. We also need to make broader regional comparisons, not only with the material from Thronos Kephala, but also looking at the material that the Pediada and other survey projects have picked up, and other Cretan sites which may yield cooking fabrics. Only then will we know if Knossos was the only importer of these truly gritty cooking wares.

Acknowledgements

First, we should perhaps make our apologies to the late John Wayne and the very-much not-late Jeff Bridges. At least one of us has seen both the 1969 film (directed by Henry Hathaway) and the more recent Coen brothers (2011) version. We would also like to thank Alexandra Villing and Michela Spataro for inviting us to contribute to the conference and the subsequent edited volume. In revising our work for publication, we have been greatly helped by our two anonymous referees and by those who gave comments at the conference itself (such as Peter Day) and subsequently (such as Antonios Kotsonas). The original study (published as Boileau and Whitley 2010) was undertaken with the financial support of the Institute for Aegean Prehistory (INSTAP) and the logistical and financial support of the Fitch Laboratory and the British School at Athens. Our study has benefited from the help and advice of A. L. D’Agata, J. Hilditch, E. Kiriati and R. Siddal among others. Permission to sample the pottery was given by the British School at Athens, the late Nicolas Coldstream, Eleni Hatzaki and Colin Macdonald. Permission to reproduce images was given by the British School at Athens, and

Howard Mason (Cardiff) helped with the images. We are grateful to all these persons and institutions.

List of abbreviations

These are those generally used by scholars studying the EIA of Knossos, as used from Brock (1957) onwards.

Cl	Classical (480–323 BC)
EG	Early Geometric (850–800 BC)
EIA	Early Iron Age
EO	Early Orientalising (700–650 BC)
EPG	Early Protogeometric (950–900 BC)
F.	Refers to the object numbered by Brock (1957) in his catalogue of finds from the Fortetsa cemetery.
G	Geometric (800–700 BC in Knossos)
KNC	Knossos North Cemetery (refers to object published in Coldstream and Catling 1996)
KS	Knossos Survey (refers to site listed in Hood and Smyth 1981, with number)
LAr	Late Archaic (c. 525–480 BC in Knossos; see Coldstream and Huxley 1999)
LG	Late Geometric (c. 750–700 BC in Knossos)
LO	Late Orientalising (c. 650–600 BC in Knossos)
LPG	Late Protogeometric (c. 900–850 BC)
LPN	Little Palace North (refers to excavations conducted by Eleni Hatzaki just north of the Little Palace, and objects published in Hatzaki <i>et al.</i> 2008)
MG	Middle Geometric (c. 800–750 BC)
MPG	Middle Protogeometric (c. 900 BC)
O	Orientalising (c. 700–600 BC in Knossos)
PG	Protogeometric (c. 950–800 BC in Knossos)
PGB	Protogeometric ‘B’ (c. 850–910 BC)
RR	Royal Road (referring to Sinclair Hood’s excavations of the late 1950s near the Royal Road, and sometimes to objects published by Coldstream (1972, 1973 and 1999))
SM	Subminoan (c. 1025–950 BC in Knossos)
UM	Unexplored Mansion (referring either to deposits published in Sackett 1992 or Coldstream and Sackett 1978)

Notes

- 1 See Nowicki 2000; the type site here is Karphi, see Seiradaki 1960, 7–9; Day 2011, esp. 330–332. Other published examples include those from Monastiraki Katalimata; see Nowicki 2008, nos. KP 200, 201 and 296. For a discussion of “Minoan” cooking wares in East Crete, see Morrison this volume.
- 2 As he put it, his aim was to record objects on a basis that was “representative not exhaustive” (Coldstream 1960, 159).
- 3 See *e.g.* Wilson 2010, 143 fig. 30.
- 4 For this, see Coldstream and Huxley 1999.
- 5 See particularly Liddy 1996, following the pioneering study of Boardman and Schweizer 1977.

- 6 See in particular papers in Karageorghis and Kouka 2011.
- 7 For Sybrita, see D'Agata and Boileau 2009; for the project as a whole, see Boileau *et al.* 2009.
- 8 Coldstream and Hatzaki 2003; see list in Boileau and Whitley 2010, 254–255.
- 9 For this, see Whitelaw 2004; Whitelaw in Morgan *et al.* 2010, 183–185.
- 10 There are also two “stray” kitchen pottery vessels, one from the “Theatral area” (near the “Geometrical Well” (Coldstream 2000, 273 E.38) and another “SW of the Palace” (Coldstream 2000, 265 A.18); see Table 7.1.
- 11 Though there are no examples of the deliberate deposition of cooking vessels before Protogeometric times (see Table 7.1). None are listed in Catling 1996.
- 12 Our study added ten uncatalogued examples, nos. 28, 32, 34, 35 and 42 (from the Villa Dionysus); and 102, 112, 113, 124 and 139 (from the Geometrical Well, northwest of the Palace). See Boileau and Whitley 2010, 253–260; and Table 7.1.
- 13 Brock 1957, 142–145 and 213–219; see adjusted scheme by Coldstream 2001, 22 (incorporating modifications by Catling 1996 and Moignard 1996). For these abbreviations, see list of special abbreviations below.
- 14 Arist. *Pol.* 1272a3; Alkman *PMG* 98 [= Strabo 10.4.18]; Strabo 10.4.16; 10.4.20; 10.4.21; Plutarch *Lycurgus* 12.1; Dosiadas *FGrH* 458 F2; Pyrgion *FGrH* 467 F 1. For discussion see Prent 2005, 441–476.
- 15 It is not clear, for example, whether the pottery listed in Hatzaki *et al.* 2008 is a complete sample, or has been selected using Coldstream's usual criteria of being “representative but not exhaustive”.
- 16 Full details provided in Boileau and Whitley 2010, 229–231 and 253–263.
- 17 Full descriptions of the seven fabric groups are given in Boileau and Whitley 2010, 243–253; the pairs and loners are described more briefly (*ibid.* 235–238).
- 18 For petrological examination of the Knossos area, see Day 1988; 1995; Day *et al.* 1999; Wilson and Day 1999; and discussion in Boileau and Whitley 2010, 231. For the local clays and their properties, see also Hein *et al.* 2004a; 2004b.
- 19 For Karphi, see Nodarou and Iliopoulos 2011, esp. 338–341; for the Kavousi area, see Haggis and Mook 1993; Haggis 2005; Mook 2005, esp. 183–185 (cooking pot fabrics 1 and 2).
- 20 We realise that the term “shimmer aggregates” is not a canonical mineralogical term. We use it here to refer to mica pseudomorphs of a highly altered rock (Boileau and Whitley 2010, 233–234 and 248–249).
- 21 Haggis and Mook 1993, 277. This fabric may be the same as group 1 of Day *et al.* 2006, 160–162; and Moody's “mixed metamorphic glitter fabric” (Moody 2005, 155) from the Vrokastro survey.
- 22 As mentioned by Coldstream (Coldstream 2001, 61). Peter Day (pers. comm.) has no recollection of this identification. For the sherd, see Coldstream and Catling 1996, 248, pl. 228.
- 23 Examples from PGB/EG contexts include KNC 63.2 (Coldstream and Catling 1996, 105, pl. 116 “gritty micaceous red clay”); KNC 285.132 and KNC 285.145 (Coldstream and Catling 1996, 248, pl. 228 “micaceous red clay”); KNC 292.86 (Coldstream and Catling 264, 264, pl. 239); KNC 292.102 *ibid.*, 265, pl. 239); KNC G.27, G.28 and G.31 (Coldstream and Catling 1996, 17, pl. 54 “deep red clay, much silver mica”); F. 473 (Brock 1957, 49 pl. 34 “dark red coarse micaceous clay”); F. 509 (Brock 1957, 51, pl. 34 “deep red coarse micaceous clay”); F. 1046 (Brock 1957, 95, pl. 61 “pink highly micaceous clay”).
- 24 Coldstream and Catling 1996, 234–235 and pl. 215. Further examples from PGB/EG contexts include: KNC 285.7 (Coldstream and Catling 1996, 244, pl. 230 “heavy red fabric, much mica”); F. 499 (Brock 1957, 50, pl. 28 “red micaceous clay”); possibly also F. 343 and 345 (Brock 1957, 36 “dark red coarse clay” “coarse dark red clay”).
- 25 KNC 65.5 (Coldstream and Catling 1996, 105–106, fig. 93, pl. 196) PGB; KNC 100.3 (Coldstream and Catling 1996, 134 fig. 102, pl. 134) LPG.
- 26 Though Antonios Kotsonas (pers. comm.), who has been going through the EIA coarse wares from Knossos for the Knossos Urban Landscape Project, suspects that there may be some sherds in fabric 4 (or “gritty red micaceous sherds”) as early as EPG times.
- 27 As originally suggested by Brock (1957, 143). Recent scholarship has tried to argue for this being not so much a “Proto-Orientalising” as a “Neo-Minoanising” style, a suggestion to which one of us (Whitley 2013) is vehemently opposed. One reason for this opposition is that the “Orientalising” interpretation is much more in line with the widespread evidence for the presence of Levantines (“Phoenicians”) on Crete during this period (evidence summarised by Stambolidis and Kotsonas 2006).
- 28 Much criticised by Hoffman (1997) and other American scholars.
- 29 The alternative hypothesis – that the cooking pots arrived with a new wave of immigrants – does not bear close scrutiny. For one thing, the only plausible “immigrant horizon” is the range of changes associated with Protogeometric B (Boardman 1967), after 850 BC. If these are immigrants, they are immigrants from North Syria, and nothing about either fabric 4 or fabric 7 suggests a North Syrian origin. For another, fabric 4 first appears in Knossian shapes.
- 30 This is our preferred interpretation, though we note that Rotroff and Lis (this volume) argue that the shift from cooking jug to *chytra* represents a change in cooking practice. This point requires further discussion.

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COOKING WARES BETWEEN THE HELLENISTIC AND ROMAN WORLD: ARTEFACT VARIABILITY, TECHNOLOGICAL CHOICE AND PRACTICE

Kristina Winther-Jacobsen

Introduction

Countless generations of potters have followed each other in transferring the knowledge and skills of the trade through apprenticeship, a potentially very conservative model of transfer forever promulgating the wisdom of previous generations. And yet changes do occur: technologies change, styles and fashions change, and customs change, begging the question, what are the guiding mechanisms of change? The aim of this article is to discuss the technological change in the production of cooking wares in Cyprus some time during the Early Hellenistic period in the context of the Hellenistic *koine*: the introduction of very thin-walled vessels (sometimes less than 0.2 cm) made from densely tempered fabrics often dominated by quartz (whether natural or culturally composed) documented at Kition, Nea Paphos, Ledra and Panayia Emathousa (see below).

The igneous rocks of the Troodos Mountains occupying the central part of Cyprus are believed to be an uplifted section of mid-ocean ridge. Their core is made up of deep-seated plutonic basic and ultra-basic rocks. Over and around these lie extrusive volcanic rocks, mainly pillow lava. Although alluvial clay deposits are rich around the Troodos Mountains, quartz-rich formations are generally limited to the southern slope of the Troodos Mountains, southeastern Cyprus, and areas in the Kyrenia Range (Fig. 8.1). Consequently, the production of quartz-rich fabrics constituted a possible challenge outside these areas, even

more so as it appears to have been accompanied by a switch from the slow to the fast pottery wheel in some areas.

Trying to understand how local potters in the pillow lava area dealt with this double technological development is part of a more extensive study to be undertaken with Anders Lindahl, Head of the Laboratory of Ceramic Research at the University of Lund in Sweden. The project was conceived under the “Artefact variability, assemblage differentiation and identity negotiation. Code-switching in material culture research” network funded by the Danish Council for Independent Research. The examination of thin sections of the ceramic ware under a polarised microscope provides the necessary information on how the potter handled the clay, *e.g.* what type of wheel the pottery was produced on (Lindahl 1986; Lindahl and Pikirayi 2010). For the measurement of the accurate proportion of quartz, including particles of <0.01 mm, an even more detailed analysis of the ware is achieved with the use of a scanning electron microscope (SEM) coupled with a microprobe (EDS). Since this project has yet to attract the funds required for an extensive programme of analyses, the article discusses the background and implications on a more theoretical level, thus tying in with several other articles in this volume.

Archaeological theory

By way of introduction, this paper begins with a brief discussion of the theoretical framework for understanding



Figure 8.1. Simplified geological map of Cyprus.

technological choice and innovation. Artefacts such as pottery vessels appear to possess an endless variability over space and time. Within the framework of behavioural archaeology, Schiffer (1987, 13–23) defined four dimensions of artefact variability: formal, spatial, quantitative and relational properties. For the purpose of this article only the formal variabilities, the observable, often measurable, physical characteristics generated by the maker engaged in the activity of producing the artefact – the technological choices – are relevant. According to Schiffer and Skibo (1997, 29), ancient potters employed a particular sequence of activities allowing them to achieve a great variety of designs, a concept similar to the *chaîne opératoire* formulated by Leroi-Gourhan in the 1960s (Lemonnier 1993), thereby establishing the premise that design is driven by performance. This is where archaeometry has proven invaluable in establishing parameters for utilitarian performance criteria (e.g. Kilikoglou *et al.* 1998). Of course utilitarian performance is only one of several design premises, alongside social and religious constraints as well as availability. Although utilitarian performance is important, multiple studies have demonstrated that it is too simple a concept to solely drive design, because of the

combination of physical and cognitive elements guiding the creative process (e.g. Miller 1985).

Another theory is offered by practice theory, according to which ancient potters were knowledgeable and reflexive in creating and applying knowledge to their routine technical activities, but they were not omniscient and did not possess free will to knowingly act as they chose (Dobres 2000, 137). As formulated by Bourdieu (1977), this now well-known paradox is known as “habitus”. Everyday conventions embodied in normative technical components dispose people to react in similarly routinised ways, explaining why the material remains of archaeological cultures disclose discernible patterning. However, very importantly, the agents and the interactive community do not always work in harmony, allowing the concept of habitus to incorporate and explain both continuity and discontinuity. In this body of thought, the discordance between the agent – the potter – and the community – his network – is the driving mechanism of change. Such discordance may be the agent’s hope of advantage – social or economic – which, according to Spratt (1982, 80), is the incentive motivating innovation weighed against the effort involved and risk of failure. Spratt’s model of

innovation processes was recently successfully applied by Rotroff (2006a) to provide insight into the introduction of Hellenistic mould-made bowls and may possibly be applied to other changes, whether stylistic or technological.

Fabrics specialisation

From a theoretical point of view, the change to specialised fabrics is innovative and involves the risk of failure: the performance characteristics may not improve in a specific utilitarian or social sense as expected by the consumers, and consequently they may not take to the new product. Within the framework of practice theory, the origin of such a technological change can be explained by the natural occurrence of, for instance, very quartz-rich fabrics in a cooking ware producing area. Such a natural advantage would allow local potters to develop a reputation for superior products, which might induce other potters to imitate their production in order to gain advantage. According to the experiments of Kilikoglou *et al.* (1998, 266), fabrics including 20–40% quartz materials exhibit remarkable crack stability, but due to increased porosity the best overall result is achieved at around 20% quartz. This is knowledge acquired from controlled experiments in a laboratory, to which, of course, ancient potters did not have access. However, cooking wares (rich in quartz sand) found at Tel Anafa in Upper Galilee suggest some practical knowledge of this utilitarian performance characteristic in the ancient world (Berlin 1997, 12–14). Two of the three dominant Hellenistic cooking ware fabrics contain 10–20% quartz, while the dominant Roman cooking ware fabric includes 16–28% quartz. Furthermore, one of the Hellenistic cooking wares, as well as the Roman ware, is exclusively quartz-tempered. But we must not forget that the (perceived) superiority of vessels is not determined by utilitarian performance characteristics alone (Müller *et al.* this volume). Superiority may also relate to status associations or straightforward availability (*e.g.* Day, Cau *et al.* this volume; Whitbread this volume). However, the pottery *koine* in the Hellenistic Mediterranean world provides evidence for the phenomenon of the widespread imitation of successful products such as thin-walled cooking wares, mould-made cups (Rotroff 2006a) or Koan-style transport amphorae (Whitbread 1995, 85) in this particular context. Still, there may be culturally or socially specific reasons relating to specific times and places for why such processes might or might not take place.

Alexandria

One case illustrates this: Alexandria was founded as a Greek

city in northern Egypt and during the Hellenistic period it became the major cultural force in the southeastern Mediterranean. In northern Egypt naturally occurring alluvial clays with a very high content of quartz dominate the pre-Hellenistic pottery production. The same clays were used for the deep casserole when the shape was introduced into the region during the early Ptolemaic period (Harlaut 2002, 272–273). However, during the 3rd century BC calcareous and semi-calcareous clays of unidentified origin came to dominate northern Egyptian pottery production, including cooking wares, until around 200 BC when the alluvial clays were reintroduced for the production of cooking wares. According to Empereur and Picon (1986, 500–501) cooking wares came to be produced in sandy (alluvial) clays in the Greek world, even though otherwise there was a general preference for calcareous clays, possibly because of a long tradition of painted decoration on a pale surface. Harlaut (2002, 272–273) explained the introduction of the use of calcareous clays for pottery in Ptolemaic Egypt by a Greek preference for light-coloured firing clays. According to Harlaut, the reintroduction of alluvial clays is best explained by the higher utilitarian performance characteristic of cooking wares made from this fabric, as is often stipulated by researchers (*e.g.* also Empereur and Picon 1986, 501) and supported by the research of Kilikoglou *et al.* 1998. Consequently, Alexandria makes an interesting case for a culturally determined change of technology that resulted in poorer utilitarian performance characteristics. It took two generations before the fabric with higher utilitarian performance characteristics was reintroduced, revealing the powerful role played by culture. Although this appears to be a strong case of culture over utilitarian performance characteristics in the evolutionary sense, we must not forget the multiple physical parameters playing a role in the establishment of a successful product, as argued *e.g.* by Müller *et al.* (this volume). Furthermore, even utilitarian performance characteristics are relative to the perception of the user, and I cannot help but wonder about the acceptable range of performance for a product to be considered of good quality and value. The relativity of performance expectations based on the perception of the user may be part of the reason why it is so difficult to answer questions such as that posed by several authors in the present volume: why were Aiginetan cooking wares so successful (see Gauss *et al.* this volume)?

Cyprus

With this in mind we turn to Cyprus: the ancient Cypriot custom of offering multiple vessels in the tomb provides a rich dataset of complete vessels of a wide variety. During the Hellenistic and Early Roman periods this included

multiple cooking wares. Cypriot traditions of Iron Age cooking wares are discussed elsewhere in this volume (Fourrier), and in this context I want to draw attention to two specific phenomena observable in the Late Bronze Age and Iron Age material. In Tomb 3 at Salamis, dated to around 600 BC, there are examples of typical Iron Age cooking pots with a high, wide, vertical neck and two vertical handles (Karageorghis 1967, 37 no. 58, 40 no. 172). Michaelides and Młynarczyk (1988, 164) pointed out that this type of vessel appears in Tomb 3 in coarse ware, plain ware and partially black-glazed ware. It would seem that although specialised cooking ware fabrics existed already in the Iron Age, the correlation between morphology and fabric was weak. Special shapes were not closely tied to special fabrics. The other related phenomenon is the coexistence of hand-made and wheel-made cooking vessels made from differently tempered fabrics in Late Bronze Age Cyprus (Spagnoli 2010, 107). This phenomenon is yet to be thoroughly investigated, but the finds from Evrykhon may suggest the continuation of this dual tradition into the Hellenistic period (see below).

Only from the end of the 4th century BC onwards do cooking pots start to appear more regularly in the publications of Cypriot material culture (see Salles and Rey 1993, 247 n. 55). The reason for this may be the focus on funerary material and the relative dearth of settlement studies in Cyprus scholarship to date. The material appears to be dominated by the three types of cooking vessels that are defined by Bats (1988) as typical for much of the Classical and later Greek world: the *chytra* for boiling, the *lopas* for stewing, and the pan for frying. The *lopas* seems to have been introduced in Cyprus only during the Early Hellenistic period (Hayes 2003, fig. 2.12), when the thin-walled *chytra* was also introduced (Hayes 2003, figs. 2.10–11; Gjerstad 1948, pl. LXXI.10). I have been unable to locate these types of vessels in Classical contexts in Cyprus, although this may also reflect the state of publication (Fig. 8.2). It is as yet uncertain to what degree the frying pan was used before the Hellenistic period (Hayes 1991, pls. XXXII.6–9).

Compared to the proportional distribution of the different types of cooking wares in domestic contexts, it is obvious that the cooking wares deposited in tombs are not representative of a particular style of cooking. *Chytrai* completely dominate the cooking wares in Hellenistic-Roman tombs in Cyprus and could have been preferred for their closed shape and volume, *i.e.* their storage capacity, which would also explain why not all of them are scorched by fire. The potential importance of the storage of foodstuffs in Hellenistic funerary contexts in Cyprus, rather than the preparation of simple meals, is suggested by the multiple transport and storage amphorae accompanying the deceased (*e.g.* Winther Jacobsen 2007).

The proportional distribution of the three basic types varies from assemblage to assemblage according to context and use. As a point of reference, the inventoried Hellenistic cooking ware assemblage in the Athenian Agora comprised 50% *lopades*, 41% *chytrai* and 9% pans (Rotroff 2006b, 16, chart 16). In Cyprus, at the Early and Middle Hellenistic site of Agios Georgios in Ledra/Nikosia, the proportional distribution is fifty-fifty between *lopades* and *chytrai*, with no pans represented (Berlin and Pilacinski 2003, 205–206; Fig. 8.2). A provenance study of pottery from this site involved only the fine wares, but the author suggested that the same local clay source may have been used for “specialty and domestic wares”, each tempered in a unique fashion (Hunter 2007, 64).

Of special interest is Basin 417 at Kition-Bamboula, a homogeneous deposit dated around 215–210 BC, representing some type of tavern or dining hall for convivial dining (Salles and Rey 1993, 227–228). The basin was located approximately 10 m from an oven for cooking (Salles and Rey 1993, 245). The content consisted of table wares, mainly small plates and bowls, a few fragments of closed vessels for liquids, and a large group of cooking wares. Among the cooking wares were a few, unique, large plates possibly for communal serving of food, about a dozen *chytrai*, approximately 20 deep pans and more than 30 *lopades*, as well as more than 50 cooking ware lids of varying sizes (Salles and Rey 1993, 245–249; Fig. 8.2). Originally Kition was a Phoenician city, but in the early 3rd century BC it was subjugated by the Ptolemaic kings along with the rest of the island. The local production of *lopades* directly inspired by the Greek *lopas* is part of the evidence for the Greek influence in the city, more prominently witnessed by the replacement of the Phoenician language and gods with Greek language and gods (Yon 2007, 60). In this particular case, the driving mechanism behind the introduction of a new type of cooking vessel is most likely increasing exposure to Greek foodways. Berlin and Pilacinski (2003, 205–206) noted how the *lopades* from Agios Georgios have vertical handles, whereas the *lopades* from Basin 417 have horizontal handles, as is known in the Greek world and illustrated by the finds from the Athenian Agora (Rotroff 2006b, figs. 82–84). *Lopades* from a roughly contemporary pit at the rural inland site Panayia Ematousa also appear to have predominantly vertical handles as did the Iron Age cooking wares, and this may be a genuine regional preference (Winther Jacobsen 2006, fig. 124; Gjerstad 1948, pl. LXXI). Panayia Ematousa is a rural site with multiple households just 7.5 km inland from Kition. The size of the stone blocks used in some of the walls suggests that it may have been part of the Ptolemaic defensive network, possibly in the late 3rd to late 2nd century BC, and Pit 1 with the *lopades* with vertical handles dates to roughly the same period, but slightly later than Basin 417 (Sørensen

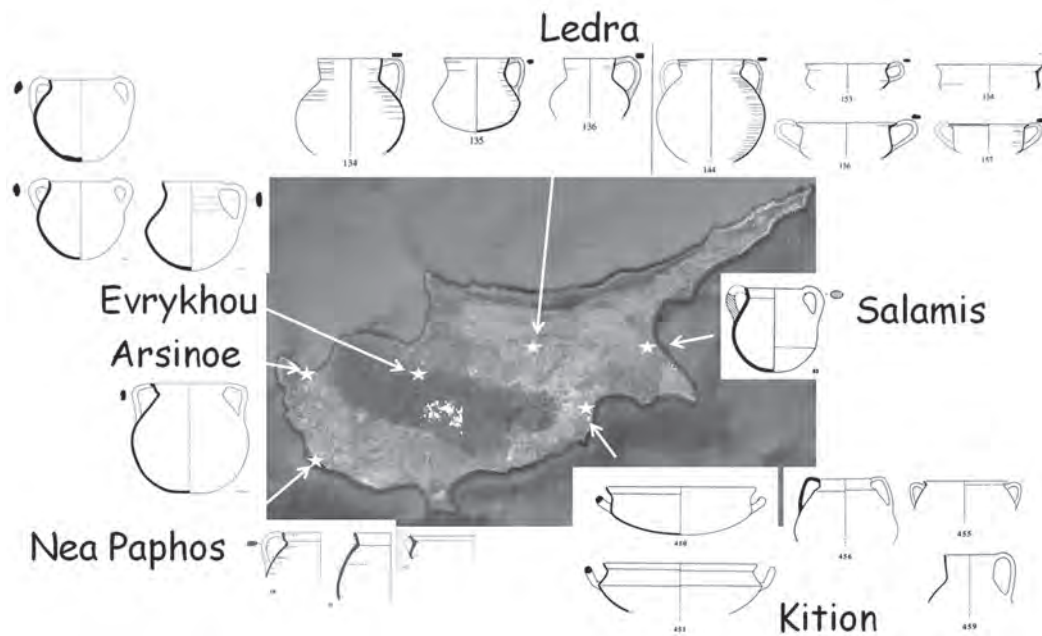


Figure 8.2. Distribution of dominant Hellenistic cooking vessels in Cyprus. Drawings after Hayes 2003, Berlin and Pilacinski 2003, Salles and Rey 1993 and Diederichs 1980 [source images modified]. Drawings by J. Humbert and E. Vassiliou.

2006a, 56; Sørensen 2006b, 124). Due to its close proximity and character one would expect the material culture of Panayia Ematousa to reproduce finds at Kition relatively closely, but the finds reflect the different chronologies of the excavated areas (Winther-Jacobsen 2006, 232). However, the preference for vertical-handled *lopades* shared at Panayia Ematousa and Agios Georgios suggests that Kition, the nearest coastal city centre, may not have been the main supplier of cooking wares for Panayia Ematousa.

In Basin 417 the deep pan (*sauteuse*), which resembles a casserole apart from the flat base, is considered a local shape by the excavators (Salles and Rey 1993, 246), and it may be a different response to Greek foodways based on local traditions. What is known in ancient Greek as the *chytra* was a common shape in Cyprus since the Archaic period, as well as being the most common type of cooking pot in Palestine during the Persian period (Salles and Rey 1993, 247–248; Gitin 1990, 236; Berlin 1997, 84). Different researchers have studied the relationship between function and shape based on written sources (e.g. Bats 1988, but see also Sparkes 1962; 1965; Sparkes and Talcott 1970). If the cooking ware assemblage of Basin 417 is considered to be representative, the absence of frying pans suggests that fried food was not part of the menu. Smaller portions of food could be fried in the deep pans and *lopades*, but since more than four times as many stewing vessels/*lopades* as *chytrai* were identified, it would appear that stewed foods played a more prominent role than boiled foods in this

Greco-Cypro-Phoenician dining context. However, the same applies to the Greek assemblage from the tholos on the Athenian Agora (Thompson 1940, 134–135; see also Berlin 1997, 94 n. 212). Of course, the proportional distribution may be skewed by a differentiated “life expectancy” of pots and casseroles, which is impossible to evaluate without ethnographic parallels and/or experimental data.

Although the fabrics are described as specialised in the publications, the available descriptions of the fabrics of the cooking vessels from Nea Paphos, Ledra, Kition and Panayia Ematousa make it impossible to determine if the vessels were made from clay from different, quartz-rich clay beds or from culturally composed quartz-enhanced fabrics. The descriptions of the pottery from Agios Georgios and Kition mention abundant sand and lime and use terms such as “more gritty” to describe the texture, and they all observe the very thin walls. XRD analysis of a single, but typical, thin-walled cooking ware sherd from Panayia Ematousa, Pit 1 – the first small step towards building a statistically viable sample – revealed the clay to be illite and the percentage of quartz to be 32%. Based on these preliminary observations, we may put forward the hypothesis that during the Early Hellenistic period, when the large, very thin-walled cooking pot with undulating or convex everted rim was introduced, a general change in wall thickness and fabrics occurred as well, a change which may have more to do with a different way of processing the clay than with a change in clay resources.



Figure 8.3. Hellenistic cooking vessels from Evrykhon Tomb 5. Photos by C. Parks and K. Winther-Jacobsen. Drawings by J. Humbert.

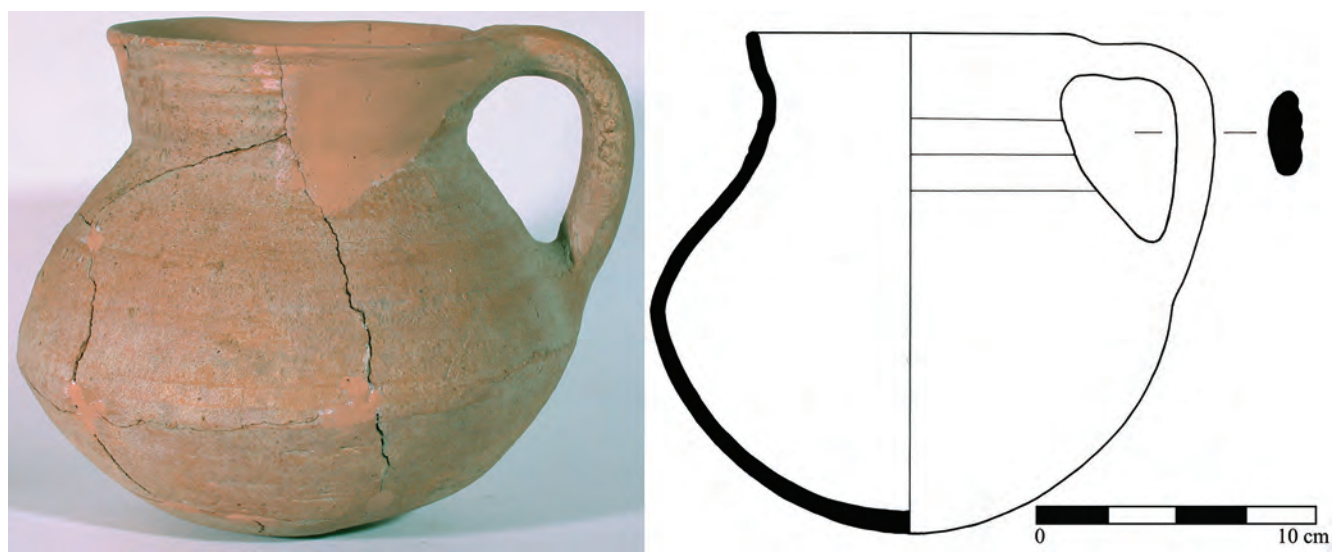


Figure 8.4. Hellenistic cooking vessels from Evrykhon Tomb 5. Photo by C. Parks. Drawing by J. Humbert.



Figure 8.5. Hellenistic cooking wares and other vessels made from the same fabric. Photographs by C. Parks and K. Winther-Jacobsen.

The hinterland

The material from the city centres and their immediate hinterland suggests a quick surrender to the thin-walled specialised cooking wares, although some regional morphological preferences, such as vertical handles discussed above and later wishbone-handles, may survive (see below) – but what of the more remote hinterlands? Evrykhou Tomb 5 is a rock cut chamber tomb with multiple burials used from the Early Hellenistic period into the 2nd or 3rd century AD (Winther Jacobsen 2007). It was excavated by Dr G. Georgiou of the Department of Antiquities, Cyprus. It is located in close proximity to tombs of a similar date and kind and should be considered one example of a common phenomenon (*e.g.* Nikolaou 1984). The tomb is located in the Karkotis Valley in the area of pillow lava 5 km south of Skouriotissa, the largest copper mine in Cyprus and consequently an economic centre of some importance, and 13 km southeast of Soli, one of the pre-Hellenistic city kingdoms of Cyprus.

Tombs of the Hellenistic period were often reused repeatedly into the Early Roman period, and contexts such as Evrykhou Tomb 5 provide a long sequence of vessels for detailed material, morphological, stylistic and



Figure 8.6. Thin section of tile fragment TM43 from Evrykhou Tomb 5.

Table 8.1. Descriptions of thin sections of tile fragments from Evrykhon 5 read by John Gordon-Smith using a standard petrographic microscope.

TM 043	Brown body, many shrinkage cracks
	Rather sparse sub-angular/rounded temper, 0.5-0.05mm, with a few larger grains of granular intergrowth
	Microcline feldspar, foraminifera, quartz, grog, opaques, amphibole, glass
TM 044	Brown body
	Sparse angular temper, 0.4-0.05mm, with a few larger grains of graphic intergrowth
	Quartz, clino-pyroxene, plagioclase feldspar with overgrowths, opaques
TM 045	Brown body, numerous needles of gypsum
	Ill-sorted sub-angular temper, 1.0-0.05mm
	Plagioclase feldspar, quartz, graphic intergrowth, granular intergrowth, opaques, grog, clino-pyroxene, devitrified glass
TM 046	Brown body
	Ill-sorted sub-angular temper, 2mm downwards
	Plagioclase and microcline feldspar some with overgrowths, quartz, graphic intergrowth, granular intergrowth, opaques, grog, clino-pyroxene, glass

technological analysis. Among the approximately 200 vessels of clay, metal and glass were 28 cooking vessels. As in the case of other tombs, the assemblage is completely dominated by *chytrai*, although it also included two *lopades* and a pan. The only morphological element that appears to be uniquely Cypriot is the high, flattened strap-handle, dubbed a “wishbone handle” by Hayes (1991, 81–82). This type of handle is documented as early as the 2nd century BC at the House of Dionysos, Paphos (Hayes 1991, Well 11.65, fig. 32.12). The same type of handle appears on a casserole and a pan at Evrykhon Tomb 5 dated to the Early Roman period, and further examples have been recorded in the region by the Troodos Archaeological and Environmental Survey Project (Winther-Jacobsen 2013). These occurrences support the theory of regional distribution of pottery in Cyprus during the Hellenistic-Roman period proposed by Lund (2002), according to which the distribution of cooking vessels with wishbone handles, Cypriot Sigillata and pinched-handled amphorae are mainly restricted to western Cyprus.

At Evrykhon Tomb 5, the Early Hellenistic period is represented by globular or biconical thick-walled cooking pots with a short neck and thick vertical handles. The vessels were coil-built on the slow wheel, as indicated by ethnoarchaeological analogy with 20th-century cooking ware productions in the Troodos Mountains (Ionas 1998, 110–115). The vessels appear rather old-fashioned compared to the thin-walled vessels from Ledra, Kition and Panayia Ematousa (Figs. 8.2, 8.3). Morphologically they are closely related to the cooking pots of the Iron Age period, such as the vessels from Salamis Tomb 3 (also Fourrier this volume). The publication of Hellenistic-Roman pottery by

Diederichs (1980, pl. 9) suggests that this type of vessel also continued into the Hellenistic period at Salamis (Fig. 8.2). Contemporary or possibly slightly later are three single-handled type vessels with high vertical rim (Fig. 8.4). The walls of the single-handled vessels from Evrykhon are thinner than those of the globular pots, and they appear to be wheel-made. They seem to be a slightly more thickset version of the thin-walled, wheel-made, Early to Middle Hellenistic cooking jugs from Ledra and Kition (Fig. 8.2). Microscopic descriptions suggested that several bowls/cups and dishes (some of which may be lids) were made from the same fabric as the cooking pots and the single-handled vessels during this period (Fig. 8.5). PXRD analyses of three fragments revealed the fabric to consist of 44–46% smectite clay minerals.¹ The dominant foreign body elements of all the samples consist of 24–33% plagioclase followed by 17–21% quartz. The local origin was indicated by the fabric’s resemblance to the tile used in the tomb to cover the sarcophagi during the Roman period. The composition of the tile fabric was revealed by petrographic analyses as originating in the lower pillow lavas of the northern Troodos foothills. This is recognisable by the combination of pyroxene, feldspar and plagioclase from the ultra-basic rocks of the Troodos Mountains and volcanic glass from the pillow lavas (Fig. 8.6; Table 8.1). PXRD analysis of a single, Early Roman, thin-walled cooking ware pot, revealed by the petrographic analysis to originate in the foothills of the Troodos Mountains, showed the fabric to consist of 39% smectite, 31% plagioclase and 28% quartz. This suggests that potters working in the pillow lave area increased the percentage of foreign body elements by 5–7% by the Roman period and the increase mainly consisted of quartz.

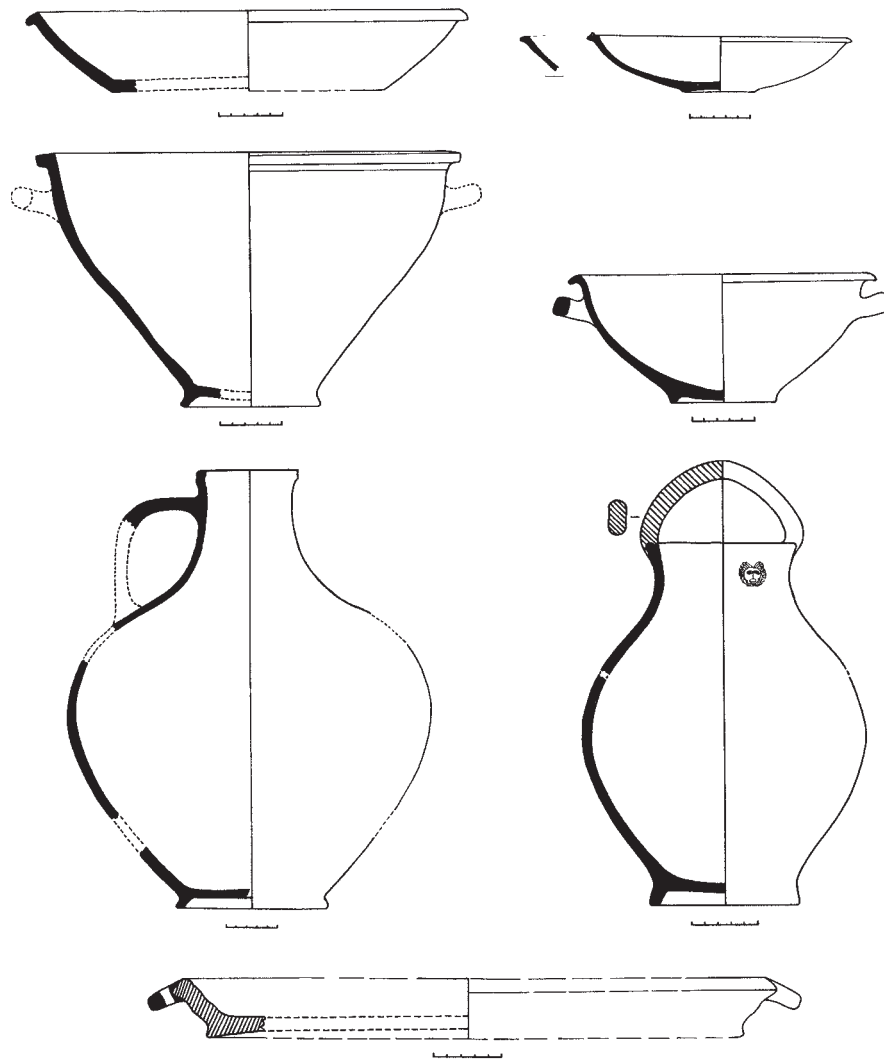


Figure 8.7. Dominant shapes recovered from the Hill of Nymphs, Kafizin. Mitford 1980 [source images modified].

Discussion and concluding remarks

At Ledra, Kition and Panayia Ematousa the combination of fabric descriptions and wall thickness suggests specialisation. None of the Hellenistic deposits discussed included non-cooking vessels made from cooking ware fabrics, thus suggesting a strong correlation between fabric and morphology during the Hellenistic period. This makes for a clear distinction from the pre-Hellenistic material from Salamis Tomb 3 and the Early Hellenistic material from Evrykhon, where the correlation between morphology and fabric appears weak. Although evidence is currently slim, I propose the hypothesis that by the late 3rd century BC, thin-walled cooking vessels of densely, probably quartz-tempered fabrics dominated the urban centres. Around this time potters working in the area of the lower pillow

lava switched to the fast wheel and gave up the coil-built globular short-necked pot. It is highly probable that this development correlated with a change in raw material management, but there is currently no evidence that would support this having occurred during the Hellenistic period on the north side of the Troodos Mountains.

The hypothesis of an increased level of specialisation in cooking wares of the Hellenistic period may be supported by the late-3rd-century BC finds from the Hill of Nymphs at Kafizin near Nikosia, even if the argument is one of absence. In 225–218 BC the Zenon Company of flax tithe collectors paid tribute to the Nymphs in the form of pottery physically made by individual members of the company (Mitford 1980). The information is recorded in graffiti on the pottery, which consists of some table and coarse ware but mostly plain basins and jugs (Fig. 8.7). The published

assemblage is focused on the inscribed vessels, which include no cooking wares. If this selection is representative, the explanation for the absence of cooking wares could be that the development of highly specialised fabrics led to a separate production of cooking wares at least by the final years of the 3rd century BC.

Natural sciences provide access to information which the ancient potters did not have the instruments to detect, but were able to experience by trial and error. Evaluating and reconstructing the cultural significance of the resulting artefact variability is a great challenge. In terms of formal properties, the range within which the vessels needed to perform at any given time in order to be successful is difficult to determine, and the ratio of inclusions in the fabric may be more important than the actual type of inclusion (Whitbread this volume). In Cyprus the correlation between fabric and morphology became strong as highly specialised fabrics were increasingly introduced into cooking ware production during the Early Hellenistic period. This development was, however, heterogeneous. On the north side of the Troodos Mountains, current evidence suggests a developing consciousness of the importance of inclusion density only during the Early Roman period. However, I propose that an extensive programme of analysis of Hellenistic cooking wares in Cyprus will demonstrate the correlation between the change from coil-building to the fast wheel resulting in the abandonment of associated shapes and a developing realisation of the importance of inclusion density already during the Hellenistic period.

Note

- 1 Analyses were done by Dr Balic-Zunic, University of Copenhagen on a Bruker-AXS powder diffractometer D8 Advance. The Rietveld method (Topas 4 program, Bruker-AXS product) was used for determination of the relative proportions of crystalline phases (clays excluded). For the determination of the amorphous+clay content and the determination of absolute quantities of crystalline phases the method of Balic-Zunic (2002) was applied.

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LIFTING THE LID ON ANCIENT CUISINE:
UNDERSTANDING COOKING AS
SOCIO-ECONOMIC PRACTICE

FROM COOKING POTS TO CUISINE. LIMITATIONS AND PERSPECTIVES OF A CERAMIC-BASED APPROACH

Bartłomiej Lis

Introduction

It is a rather recent trend in ceramic studies to use an in-depth analysis of pottery to elaborate upon issues of social and political developments. Most notably, throughout the last decade the field of Aegean archaeology has been flooded with contributions utilising the concept of feasting in the interpretation of the archaeological record (e.g. Wright 2004; Hitchcock *et al.* 2008). Cooking pots were not excluded from this discussion, yet it would be an exaggeration to claim their study contributed a lot to the interpretation of the evidence, even though preparation and consumption of food is a fundamental constituent of many feasting events. Leaving the issue of feasting aside, I will try to present a few approaches to cooking pots, mostly deriving from my own research on material from the site of Mitrou (Central Greece),¹ and to show their perspectives and limitations. Naturally, the discussion offered here cannot exhaust the vast number of ways in which one can approach cooking pots.

Limitations

In accordance with the title of my contribution, I will discuss both the perspectives and limitations of ceramic analysis, beginning with the latter. The major limitation is the nature of archaeological contexts. We know all too well that ideal circumstances rarely occur and one would

wish that finds such as the house at Papadiokambos (Morrison *et al.* this volume), where we can look at the cuisine in a kind of freeze-frame, were the archaeological staple. More often, however, we are faced with only partially excavated contexts, mixed fills, or dumps. These circumstances impose serious limitations, which led me to turn my own study of Late Bronze Age cooking pots from Mitrou (Lis 2010; 2012a) into a more technological and less culinary one. Nevertheless, the archaeological context, while often limiting, is also our greatest perspective. The amount of information one can retrieve from both ideal and “imperfect” contexts is unlimited, and it is dependent mainly on one’s use of various methods and their combinations. What follows here is a discussion of various approaches to cooking pottery, grouped under common headings.

Morphology

Looking at the morphology of any vessel is the simplest way to disclose some of its functional properties. By analysing single forms, we can look at their features – such as spouts, legs, handles – and better understand how the cooking pots were used. General proportions can be meaningful as well. Wide mouths, for example, enable fast evaporation and easy access and are thus suitable for dishes requiring thickening of liquids and frequent stirring. It seems this was not desirable to Mycenaean cooks, since really wide

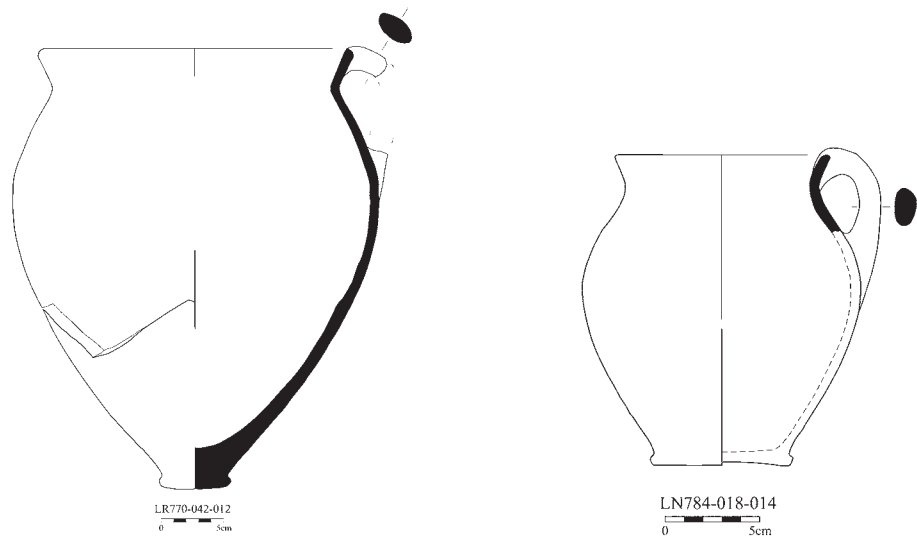


Figure 9.1. Stability of cooking pots: Early Mycenaean period (LR770-042-012, LH I-II) and Late Mycenaean period (LN784-018-014, LH III C). Drawing T. Ross, inking K. Górka.

mouths are rare. Shallow and wide-open shapes, like some of the tripod cooking pots or tripod trays, appear suitable for frying and frequent interference into the cooking process. Deep capacious shapes favour low evaporation, and seem to require a longer cooking process and liquid content, as stirring of thicker substances placed in such pots might be difficult.²

Considerations of a vessel's stability disclose a lot of data about how they were used for cooking. For example, many of the early Mycenaean cooking pots are not particularly stable and some would not even stand on their own. Their narrow but splaying bases seem to have acted as stabilisers only if the pot was submerged in embers (Fig. 9.1a). Also, sometimes the bases of otherwise only wiped cooking pots show a certain lustre. This unexpected feature was probably an effect of rotating the base against hot embers. Their conical lower bodies, as opposed to more baggy and globular shapes, might have come in quite handy when there was a need to add more coals around the pot for faster cooking. Nevertheless, control over temperature must have been limited with the use of such cooking pots. Later on, the centre of gravity of Mycenaean cooking pots moves down as their bases increase in size and the bodies become more globular (Fig. 9.1b). More need for stability was probably related to new ways of cooking and possibly a new arrangement of cooking installations, such as hearths. It seems that during this time pots were placed at the edge of hearths, and not directly in embers. This is confirmed by more localised burning marks, as examples from 12th-century BC Lefkandi illustrate (Fig. 9.2). One-handed cooking pots have their burning marks opposite the handle, the two-handed specimens between

the handles on both sides. Control over temperature was in this case much simpler as one could easily place the pot closer to or further from the fire.

Tripod cooking pots offer great stability without the need for a fixed hearth, as coals may be easily placed underneath the base. In this respect, it is interesting to invoke early examples of tripod cooking pots on the Greek mainland. Contrary to their counterparts (and possibly prototypes) from Crete, they are equipped with very short legs (Fig. 9.3). Thus, one of the main advantages of a tripod cooking pot, the opportunity to place coals underneath, is almost entirely wasted. This betrays two important characteristics of Mycenaean culinary practices. Firstly, they were willing to accept a novel form, although they continued to use it in the same way as they would use a standard flat-based pot. This attitude is additionally emphasised by the addition of a flat base to the tripod cooking pot, which is redundant and thermally less effective. Secondly, the more frequent use of tripod cooking pots confirms a growing concern with the stability of the pots, another sign of changed cooking practices discussed in the case of flat-based cooking pots. Both phenomena, the increased popularity of tripod cooking pots and the appearance of more stable jars, seem to overlap chronologically, although at sites like Mitrou, the first amassed appearance of tripod cooking pots seems to predate the popularity of more stable pots. With respect to the morphology of tripods, the late Mycenaean (from Late Helladic [hereafter LH] IIIA2 onwards) Aeginetan tripod cooking pots deserve to be mentioned.³ They were widely traded all over northeastern Peloponnese and central Greece and constitute one of the few Mycenaean tripods that take full advantage of the potential this form has to



Figure 9.2. Lefkandi one- (65-P89) and two-handled (65-P139) cooking pots showing localised burning marks. Photo B. Lis. Reproduced with the permission of the British School at Athens.

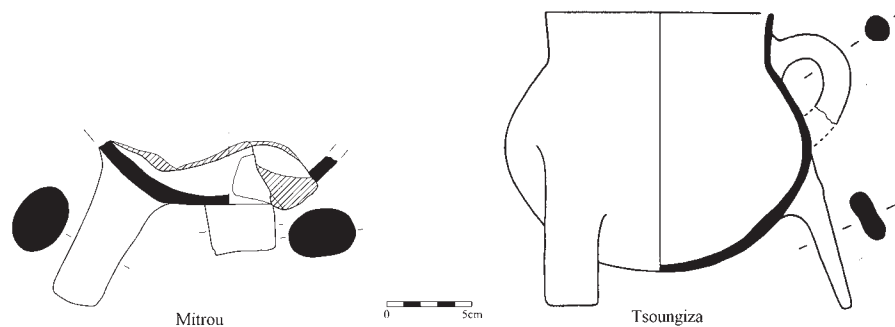


Figure 9.3. Examples of Mycenaean tripod cooking pots with only slightly raised bases, LH II Mitrou (LG790-027-011) and LH IIIB1 Tsoungiza (228-2-235). Fragment from Mitrou: drawing T. Ross, inking K. Górka. Cooking pot from Tsoungiza: after Thomas 2005, 522, fig. 31.1, reproduced courtesy of the Trustees of the American School of Classical Studies at Athens.

offer. Their legs are very sturdy and long in comparison to other contemporary tripod legs, often measuring more than 10 cm in length, thus providing a lot of space between the base and the ground.⁴ The bases of late Mycenaean Aeginetan tripod cooking pots were invariably rounded, which is particularly efficient in terms of thermal shock absorption and heat distribution.

Burning marks

The burning marks present on almost every cooking pot that was used on a regular basis give ceramicists an almost direct contact with the process of cooking and cuisine. Both

interior and exterior marks are important. The interior ones inform us not only about failures of ancient cooks, being traces of charred food, but they also indicate spots where the highest temperature was applied, which charred the organic matter that infiltrated the walls of the vessel. As the experiments of J. M. Skibo show, a black horizontal line that may be visible in the interior informs us about the level up to which the pot was filled with content (Skibo 1992, 149). Exterior marks, as already shown on cooking pots from Lefkandi, are most informative about the way of cooking and the relation of fire to the pot. Naturally, the better the pot is preserved, the more information one can retrieve from its burning marks. Single sherds are usually the least informative.



Figure 9.4. Brazier and dippers from Mitrou with burning marks. Drawing R. Doscsan and T. Ross, inking K. Górká, photos B. Lis.

Combined analysis of morphology and burning marks can provide great results and help to overcome preconceived interpretations. Studying one of the deposits from Mitrou, I was able to redefine previous functional ascriptions and identify two specialised pieces of kitchen equipment. First, a vessel initially described as a brazier (Fig. 9.4) was thought to be a utensil for carrying embers; however, both the burning marks and the vessel's morphology point to

an alternative use. The burning marks are more evident on the underside than on the interior, something not expected from a vessel used to carry coals. Those on the interior are concentrated at the edges and not in the centre of the vessel. Furthermore, the handle is not attached below the raised wall of the bowl, but just at its edge, offering no proper protection for the hand. The heat from coals would flow directly onto the hand of a person carrying the

brazier. Examples of canonical braziers from Pylos (Blegen and Rawson 1966, 412, figs. 395, 396) and Zygouries (Thomas 1992, 332, 333, figs. 89.1–3) pronounce the morphological differences in terms of the proper placement of the handle. Taking all these observations into consideration, I would like to interpret this vessel as a frying pan, and not a brazier. More specifically, the context suggests that this pan could have been used to cook shellfish (Vitale 2008). The other specialised shape from the discussed deposit is the dipper. Dippers executed in cooking pot fabric constitute a rarity on the Mycenaean mainland. The immediate functional association of that shape is as a vessel to remove hot contents from a cooking pot. However, unpainted dippers made in a semi-fine fabric are more than appropriate for this aim. Moreover, the dippers in cooking pot fabric are larger than the fine ones and cannot be used with most of the cooking pots, as they would not fit into them. Finally, the examples from Mitrou display burning marks, which are not to be expected if their function was just to remove the content. Therefore it seems more plausible that these dippers constituted independent cooking utensils used to warm up small amounts of food or liquid, which were probably removed from a larger cooking pot or other vessel.

Analysis of the cooking assemblage

Analysis of single forms is important, but it is essential to look at the entire cooking assemblage in order to understand how particular forms were used together. We can ask a variety of questions concerning formal composition, variety, size distribution and ratios of different shapes to each other. Looking at these variables at Pylos, I was able to reconstruct two sets of vessels (Lis 2008b, 17). The first one is made up of small tripods and braziers, which were found in corresponding numbers, possibly accompanied by flat-based jars. Shallow pans and lids might have constituted a second one. These two sets could hypothetically have been merged into one set used by a few people. Food of more fluid consistency could have been prepared in a large flat-based cooking pot and then shared between several groups of consumers. It could have been kept warm in a small tripod cooking pot. Meat would be either grilled on the fireplace or fried on a pan with/without lid and served using the shallow angular bowls. The liquid food from the tripod cooking pot could have been poured over the meat, using small spouts present on some of the examples, or the meat was dipped in it. It is a purely speculative reconstruction, but it shows how an unsophisticated set of vessels can be used for preparation of a quite elaborate cuisine.

Whenever different deposits dating to the same period are available for study, one can compare them and draw

conclusions on the differences in cooking assemblages used in diverse households or at different social occasions. The latter was possible for early 14th-century BC deposits from Mitrou. The deposits include both household rubbish (deposit from trench LP785) and remains of non-ordinary meals with ritual connotations (deposits in trenches LL784/785 and LN784, for which see the discussion in Vitale 2008). Contrary to expectations, there was no significant difference in the size of the vessels. The difference was more in the composition of the assemblage, and, rather surprisingly, in their technological aspects. Non-ordinary consumption included two rare vessel types, the brazier and the dipper, discussed above as specialised cooking equipment. In terms of technology, there was a dichotomy of “wheel-made” versus “hand-made” vessels. It can be argued that the specialised utensils were used for more elaborate culinary practices, not performed in households on an everyday basis. The technological dichotomy may be accidental, resulting for instance from slight chronological differences. Another explanation, however, is possible provided that these technological differences were features apparent to consumers and that they were important to the hosts of the event documented in the trenches LL784/5 and LN784.

By comparing different households one can single out and interpret those that stand out with respect to their cooking equipment. At 12th-century BC Lefkandi (Evely 2006), there are households which display large cooking potential, apparently bigger than that attested in other households. Room 11 of the West House alone yielded cooking pots with an overall capacity of 37 litres, which is much more than the overall capacity of cooking pots found in other houses. At Tiryns (Stockhammer 2008), a single household of Phase 2 contained as many as 11 cooking pots, some of which had a capacity exceeding 10 litres. Although no other household is available for comparison from the same site, the total capacity must have exceeded the everyday needs of the inhabitants. At least on the Greek mainland, substantial capacity is due to a large number of two-handled cooking pots, with a low variety of accompanying cooking utensils. This might suggest that during the 12th century BC it was not the variety but the quantity of food that was important. The largest cooking pots at each site reach c. 15–17 litres, an amount appropriate to feed many people, yet with the same meal. The accumulation of cooking pots in some of the households may reflect their inhabitants’ particular involvement in feasting activities (Clarke 2001, 156).

Comparison of cooking equipment between ordinary households and Mycenaean palatial contexts does not reveal great differences in terms of composition. The only notable difference is that some specialised pieces of equipment, such as the griddle (Hruby 2008; Lis 2008a), are found in greater

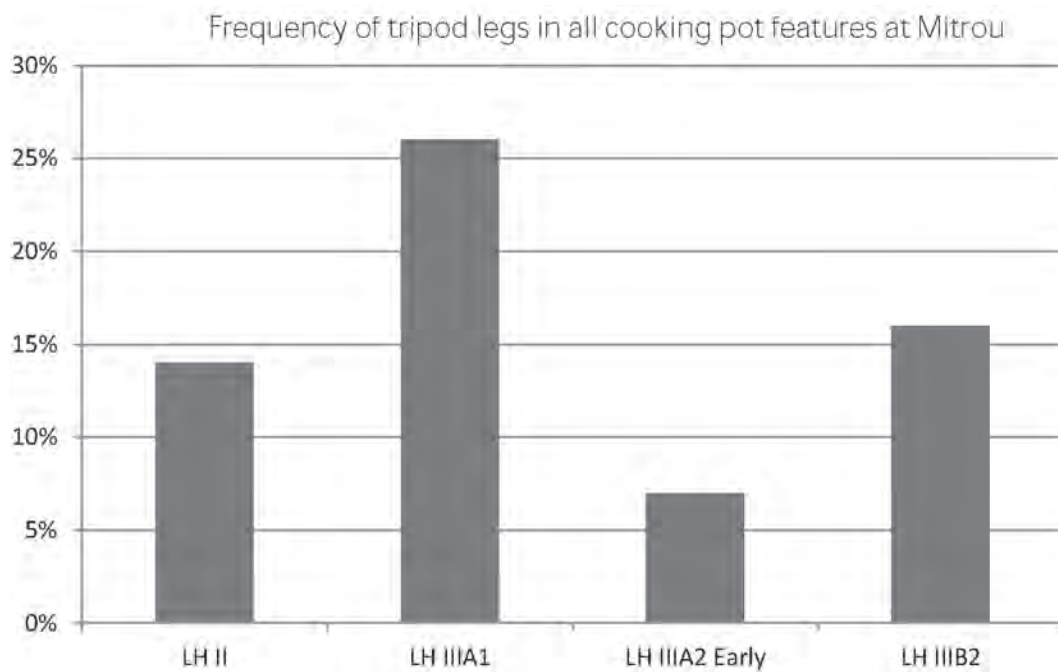


Figure 9.5. Frequency of tripod cooking pot legs at Mitrou. Graphic chart B. Lis.

quantities at the palatial sites (Pylos, Tiryns). These only slight differences may be striking at first glance, but it is plausible that the main dichotomy between palaces and ordinary settlements is indicated by the use of a category of cooking equipment that is preserved only in rare cases, namely metal vessels (Matthäus 1980). If haute cuisine⁵ was ever developed in Bronze Age Greece (Hruby 2006; Isaakidou 2007), it may well have been metal cooking pots that were primarily used for preparation of the elaborate dishes. L. Bendall speculated on different qualities of drinking vessels used at Pylos, which were linked to different status of their users. The metal ones would be most prestigious, used in the megaron of the palace (Bendall 2004, 122–123), and such a distinction may as well have applied to the cooking equipment. Metal tripods are depicted on a fresco fragment from above Hall 46 (Lang 1969, pl. 122), and they are recorded on Linear-B tablets, for example on the Ta series at Pylos, which list various equipment used at ceremonial events (Palaima 2004, 233, 235). An indirect hint of the presence of metal tripods is the existence of their clay imitations (see below). All in all, clay vessels are, in my opinion, not the most informative material to shed more light on the problem of haute cuisine.

Diachronic perspective

A diachronic perspective is particularly advantageous

in the study of cooking pots and cooking assemblages, because changes in the culinary sphere are usually slow, although dramatic turns are not unknown. At Mitrou, I was able to follow the local history of tripod cooking pots, with their appearance in the LH II period, their peak around the end of the 15th century BC (LH IIIA1 period) and a sudden decline some decades after (LH IIIA2 Early period, Fig. 9.5). The first appearance of tripod cooking pots at Mitrou, already in respectable amounts, during the LH II period is a unique phenomenon. No other site on the Greek mainland, which was not under Minoan influence, yielded substantial numbers of tripods at such an early date. The tripod cooking pot becomes a standard constituent of a Mycenaean repertoire only a century later. This attests to a certain innovativeness of local society, probably its elite. The decline of tripods' popularity in LH IIIA2 Early period may be interpreted as a sign of a shift in preferences towards more traditional forms during the final days of the local elite, right before the onset of the palatial period (beginning of the 14th century BC).⁶ Interestingly, the decline of tripod cooking pots at Mitrou is contemporary with their sudden popularity in the feasting deposit from Tsoungiza, where they appear for the first time in considerable numbers (Dabney *et al.* 2004; Lis 2008a). There, the political situation was much different, because the elites from Mycenae were trying to subdue the settlements in their hinterland through feasting. Part of their strategy was to impress, and the introduction of

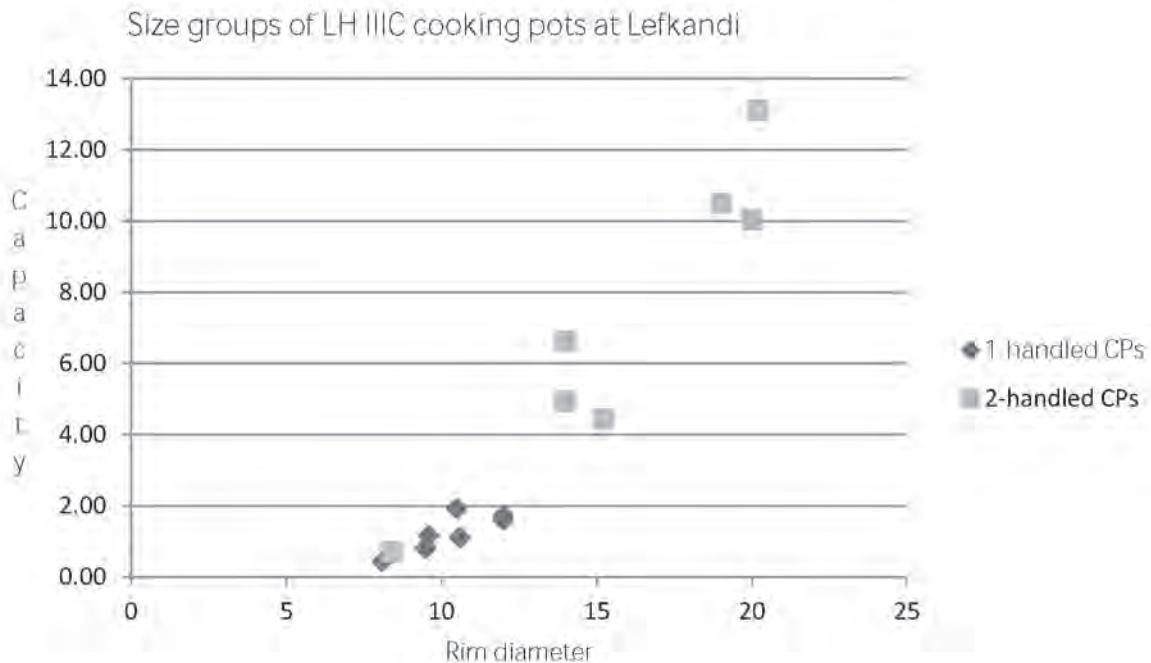


Figure 9.6. Size groups of LH IIIC cooking pots from Lefkandi. Graphic chart B. Lis.

novel cooking utensils (for the Argolid and Corinthia) fits this concept very well.

A diachronic perspective combined with a calculation of cooking pots' capacities is able to demonstrate how the average volume of a cooking pot changed over the centuries. For such an analysis a large number of complete pots from a single site would be preferable. Nevertheless, even from a limited number of measurements from different sites,⁷ I was able to deduce that apparently the average size of the cooking pot decreased over the LBA, and was accompanied by the appearance of standardisation of sizes and shapes. By the late LBA, standard one-handled cooking pots' capacity measures between 1 and 2 litres and the standard two-handled ones are double that size (Fig. 9.6). In comparison, early LBA cooking pots are on average much larger,⁸ although smaller examples were also present, and do not show signs of standardisation. This might suggest that the variety of meals and frequency of their preparation increased. It is, of course, only a very general pattern subject to strong regional and even inter-site variations.

One can also look at a diachronic frequency of imports. Apart from illustrating trade connections, this may shed some light on the taste of consumers, at least for the choice of their cooking pots. We know very well from modern accounts that cooking pots of particular origin, like the *tsoukalia* from Siphnos, were thought to be the best for preparing certain recipes (see Whitbread this volume; Kyriakopoulos this volume). This might have

been the case in prehistory as well. At Mitrou, the very end of the palatial period (c. 1200 BC) seems to have been a particularly cosmopolitan time for local kitchens. About 50% of cooking pots came from Aegina (Fig. 9.7a; Lis 2012b), reversing the usual relation of local to imported material, especially in the realm of cooking pottery. In addition, part of the assemblage consisted of wheel-made, high-quality, thin-walled and burnished cooking pots (Fig. 9.7d), almost giving the impression of bronze vessels, which probably came from areas located north of Mitrou. Similarity to the metal vessels is evident also in other cooking pots. Two of the tripod cooking pots (Fig. 9.7b,c), each of different shape and executed in different fabric of still unknown provenance, imitated the metal prototypes plausibly used by the palatial elites. One is a carinated tripod cooking pot (Fig. 9.7c), a type that shows up immediately before the fall of the palaces and is very popular in the first stages of the LH IIIC period (Lefkandi, Evely 2006, 148, 210, figs. 2.35.4–5). It has no predecessors in clay forms, but is a well-known form of a metal cooking vessel (Matthäus 1980, 102–107, figs. 74–76, 78). The second one has the form of a cauldron (Fig. 9.7b), which is another form found among metal vessels, with the best example coming from the House of the Tripod Grave in Mycenae (Onassoglou 1995, 56, fig. 2). On the preserved handle there is a small protrusion that may allude to a metal rivet. Also this type of tripod cooking pot becomes popular in the first stages of the LH IIIC period.

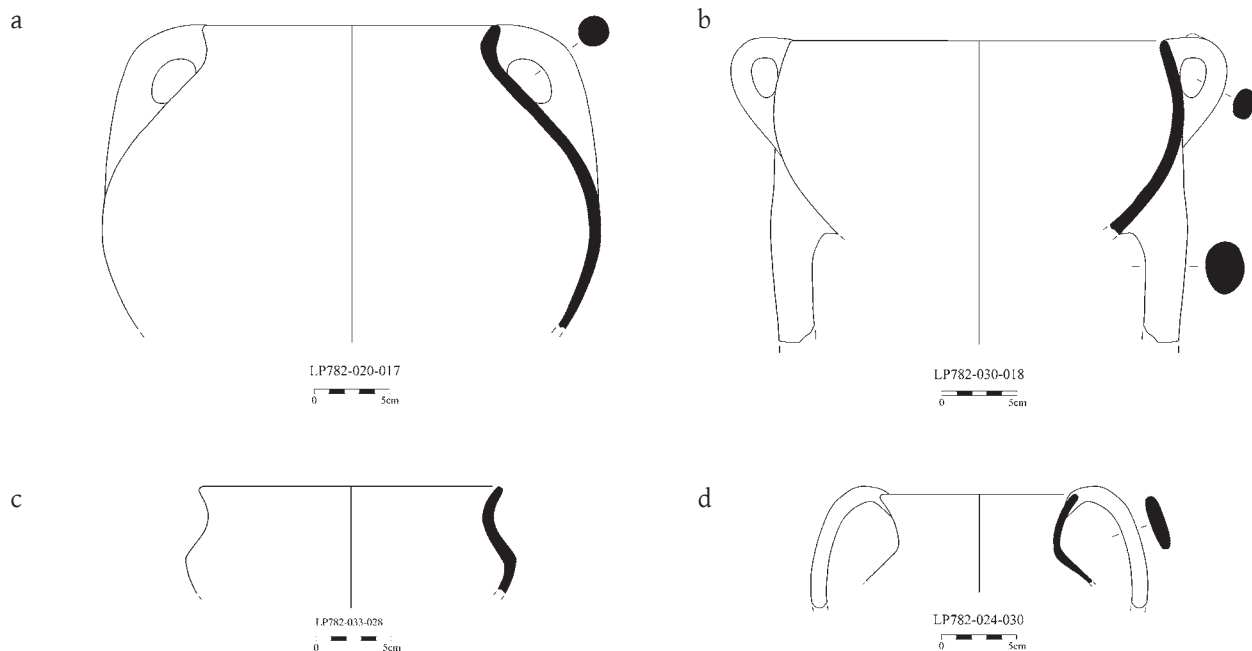


Figure 9.7. Cooking pots from LH IIIB2 Late deposit at Mitrou. Drawing and inking T. Ross.

Context

Another way of analysing cooking pots in the quest for ancient cuisine is by a thorough examination of the context. Looking at other pottery found in the same context as the cooking pots can be helpful for understanding their use. In his dissertation, P. Thomas analysed an assemblage of the so-called Potter's shop at Zygouries (1992), where masses of pottery were recovered, including many hundreds of cooking pots, in particular a shape with a wide mouth – a rarity for the Mycenaean mainland. As the name of the building suggests, it was previously thought to be a potter's workshop. Thomas' excellent study demonstrated that the piles of pots were utensils used in the perfumed-oil industry and that cooking pots were destined for the first stage of manufacture, called *stypsis*, *i.e.* the boiling of aromatics in olive oil. Other unusual pots in combination with their capacities fit this model very well (Thomas 1992, 283–300). Identical cooking pots were found in Room 60 at the palace of Pylos, whose interest in production of perfumed oil is well documented (Shelmerdine 1985). Nevertheless, although both the assemblage of this room and the involvement of the palace in perfumed oil production have been widely discussed, the connection between the two has never been strongly suggested.⁹ The two-handled cooking pots, together with all the other unusual pots found in that room, helped me to contest theories interpreting Room 60 as a storage room for equipment used for feeding the palace staff (Hruby 2006) or lower-ranked participants in feasting

episodes outside of the palace (Bendall 2004). I put forward another hypothesis that at least part of the assemblage had some industrial use, possibly in connection with perfumed oil production (Lis 2008b). Although the particular pots are different from those found at Zygouries, their morphology and capacities suggest that they might have served, as a set, similar functions. These examples are an important warning to us to remember that not all cooking pots were necessarily used for food preparation.

Naturally, cooking installations should be one of the main foci of a contextual study. In this respect, it is quite striking that ovens are rare on the Mycenaean mainland, in contrast to Crete. Either we are missing or misinterpreting something in the record, or baking was not frequently practised by the Mycenaeans.¹⁰ Also large lids, which could have been used as ovens (*cf. e.g.* Kyriakopoulos this volume; Hruby 2006, 148–150), are not frequent either. Yet it is undisputable that they must have somehow baked their bread. Griddles, an enigmatic form which could have been used for baking flatbread, are mostly attested during the LH IIIB period and thus cannot entirely fill the gap. This example clarifies how much there is still to establish about Mycenaean food and cuisine.

Scientific analyses

Another source of information about cuisine, seemingly inexhaustible, are archaeozoological and archaeobotanical

analyses, which can provide further “food” for our investigations (see *e.g.* Schörner this volume). This part of discussion goes well beyond ceramic analysis, but my intention here is to discuss how these analyses can be integrated with the data recovered from cooking pots. In this respect, V. Isaakidou rightly pointed out that “discussion has scarcely gone beyond ‘shopping lists’ of ingredients” (2007, 5). Nevertheless, she made a successful attempt in the study of animal bones from Knossos. Isaakidou was able to show that the portions of meat used for further culinary processing decreased with time, suggesting that not only roasting, but also boiling, frying or stewing appeared as possible ways of meat preparation. Moreover, on goat, sheep and pig bones she detected peculiar more or less equidistant cut marks, inflicted transversely across the shaft, which may constitute traces of sophisticated methods of preparation (marinating) or presentation of meat. Such studies, if carried out on a larger number of sites with deposits covering longer stretches of time, can greatly contribute to our understanding of cuisine development and can be successfully integrated with analogous studies of cooking pottery. Yet, as Isaakidou notes, this still remains to be done.

Not only animal bones, however, can be a source of dietary information. Human bones can be subjected to stable isotope analyses, which can provide information about the kind of proteins consumed. These analyses disclose long-term diets on a general level, showing consumption of marine versus terrestrial proteins and plant versus animal foods. Human teeth provide another set of data on their owner’s diet; for example, dental micro-wear and oral health analysis can be applied, revealing additional data on ancient diet. When it comes to data incorporation, two important limitations are revealed. Firstly, results pertain only to particular individuals, and a large sample is needed to reveal patterns. Secondly, these patterns comprise general dietary data of a far lower resolution than anybody studying cuisine would wish. Nevertheless, data recovered from skeletons can be quite helpful in elaborating differences in subsistence between various societal strata.

The residue analysis of pottery is a potentially powerful and recently very popular method in Aegean archaeology, which can bring together ceramic and archaeobiological evidence in search for the cuisine of the past. For an archaeologist without a background in chemistry, it might appear as if now prehistoric cuisine is finally forced to disclose its recipes. However, before this can happen, one needs to be aware of some serious limitations that apply to such a use of residue analysis. First of all, the result of residue analysis is only a list of components deriving from substances which were present in the pot at any given point throughout its whole life (see Cramp

and Evershed this volume, with relevant literature). In the case of cooking pots, which were in all probability used to prepare different dishes, we receive a list of ingredients, but by no means recipes. Moreover, the list is incomplete, as some of the substances will probably not be detected. A second serious limitation is the question of representativeness. Residue analysis is often applied to a wide array of pots and not many examples of the same form (in-depth research on Roman mortaria by Lucy Cramp [see Cramp and Evershed this volume] is a notable exception). This was, in my opinion, the main shortcoming of the programme behind the exhibition “Minoans and Mycenaeans – Flavours of their Time”.¹¹ A wide array of pottery forms has been analysed, yet only a few were represented by more than one or two examples. The results, while certainly interesting and widely referred to, cannot be considered as representative for more than the specific vessels surveyed. Especially in respect to cooking pots, in which many different ingredients were cooked, dozens should be analysed to achieve reliable results suitable for interpretation. Interpretation is also a difficult issue because certain components can derive from a number of different products (Cramp and Evershed this volume). Is tartaric acid, for example, evidence for wine, or maybe only of grapes being stored or processed in a vessel? All this illustrates the fact that even the use of technologically advanced methods does not necessarily make the leap from cooking pots to cuisine any shorter or easier.

Of course there remains experimental archaeology. It can be very useful to verify considerations about the way certain vessels were used and to realise some practical issues (see Morrison *et al.* this volume). When it comes to recipes, this method becomes more problematic. Constructing (and not re-constructing, as in the case of Papadiokampos) ancient recipes is a subjective process, and criteria for evaluating the results must remain ambiguous.

Final remarks

In conclusion I would like to stress the obvious. The best results can be achieved through gathering and integrating information from as many different methods of analysis as possible. Although probably every archaeologist would put his/her signature to this statement, successful attempts at reconstructing ancient cuisine are still scarce and remain in high demand for the future. The major obstacle to arriving at such holistic studies, apart from financial constraints, is the fact that the results of different analyses are rarely available for comparison and joined-up comprehensive interpretation. In order to amend this situation, project directors should enable and encourage direct interaction and exchange of ideas between various

specialists during the study of ancient remains before publication. Such temporal coordination could be a key to the success of future archaeological programmes aimed at fruitfully integrating a variety of scientific approaches with archaeology.

Regarding the study of single groups of artefacts, such as cooking pots, one should approach them from as many possible angles as possible. I hope to have shown at least a few such avenues. Conferences such as the conference out of which the present volume arose, or the symposium held in November 2010 in Nicosia (Karageorghis and Kouka 2011), clearly show that the coming decades will bring more in-depth studies of cooking pottery and cuisine than the preceding years.

Acknowledgements

Herewith I would like to express my gratitude towards Aleydis Van de Moortel and Eleni Zachou, directors of the Mitrou Archaeological Project, for their invitation to study the Late Bronze Age cooking pots from Mitrou. I would like to thank Jeremy Rutter, Aleydis Van de Moortel, Salvatore Vitale and the anonymous reviewer for their comments on the earlier drafts of this article, and Tina Ross for language corrections.

Notes

- 1 The site, located on the coast of East Lokris, provided stratigraphic evidence for apparently uninterrupted habitation from the Early Bronze Age IIB to the Late Protogeometric period. For a general introduction, see Van de Moortel and Zahou 2005; Van de Moortel and Zahou 2012; Van de Moortel 2007 and Van de Moortel 2009.
- 2 For an example of such a functional analysis of morphology, see Yasur-Landau 2003/2004 [2006]; Lis 2008b.
- 3 Lindblom 2001, 37–38, fig. 52.1050, 1052; for earlier examples of Aeginetan tripod cooking pots, see Gauss *et al.* this volume.
- 4 The longest recorded Aeginetan leg so far measured by the author was 17.5 cm.
- 5 It is important here to stress the difference between *haute* and *differentiated* cuisine. According to the seminal book by J. Goody (1982), *haute cuisine* is characterised by use of rare ingredients, creation of elaborate recipes, introduction of exotic/foreign recipes, and presence of specialised personnel, in particular those responsible for inventing and executing elaborate recipes. Differentiated cuisine, as understood here, is simply a different type of cuisine used by higher social strata, and as such this type of cuisine probably existed in the later Mycenaean times.
- 6 These ideas were first presented by myself, Salvatore Vitale and Andrew Koh in a paper titled “Wining and dining at Mitrou, East Lokris. Diet, consumption, and socio-economic changes in a ‘peripheral’ site of the Mycenaean mainland, circa 1375 to 1190 BC” held at the conference “Subsistence, Economy and Society in the Greek World. Improving the integration of archaeology and science” in March 2010 at Athens.
- 7 For my calculations I used well-preserved cooking pots from sites in Central Greece and Northeastern Peloponnese.

- 8 Two Early Mycenaean cooking pots from Mitrou had a capacity of 11.1 (LR770-042-012, LH I-II) and 7.2 litres (LE792-018-012, LH I). Three LH I cooking pots from a household in Tsoungiza (Rutter 1989) had a capacity of 6.4 (no. 9-2-8), 8.1 (no. 9-2-9) and 11.0 litres (no. 1116-2-1).
- 9 Only certain shapes from Room 60 were considered appropriate for perfumed oil production (Foster 1975, 173f; Shelmerdine 1985, 48), but not most of the assemblage stored there.
- 10 Cooking dishes, which, as shown by Morrison *et al.* (this volume) could have been used to bake bread, are entirely missing from the Mycenaean repertoire of cooking utensils.
- 11 Tzedakis and Martlew 1999; for the exhibition’s scientific background see Tzedakis *et al.* 2008.

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COOKING UP NEW PERSPECTIVES FOR LATE MINOAN IB DOMESTIC ACTIVITIES: AN EXPERIMENTAL APPROACH TO UNDERSTANDING THE POSSIBILITIES AND PROBABILITIES OF USING ANCIENT COOKING POTS

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A great variety of cooking pots are found in the archaeological record, across geographical areas and across time periods. Significant distinctions exist in vessel morphologies, fabrics, sizes and manufacturing techniques. To offer one explanation as to why these design differences exist, the Papadiokampos excavation programme takes an experimental approach that incorporates the findings from ceramic studies, archaeology, zooarchaeology, ecology and ethnography to illuminate the probable pathways ancient people might have taken to prepare cooked food. As a case study, we applied our approach to the evidence for domestic cooking unearthed in House A.1 at the East Cretan coastal site of Papadiokampos, where on the ground floor evidence for Late Minoan I cooking technology is preserved in Rooms 5 and 8 and on the South Porch. At the time of the destruction, the occupants of House A.1 were simultaneously preparing meals of local shellfish in three different types of cooking pots. These varied domestic cooking scenes in House A.1 provide insight into the individualised ways in which people, and in this exceptional case even people living in the same building, use different cooking technologies. Here we present one aspect of this work.

Research design and background

Holistic ceramic studies identify ancient cooking pots

In archaeology, cooking pots form a unique category within ceramic typologies due to the necessary parameters of their use for preparing cooked food. Cross-culturally, cooking pots are made in a variety of shapes, sizes and ceramic fabrics, but are designed to have a thermal quality that allows them to adapt, without cracking, to the rapid temperature fluctuations of the hearth-fire (Kingery 1955; 1989; Rye 1976; Bronitsky and Hamer 1986). For this reason, archaeologists classify cooking pots as specialised domestic vessels, and often emphasise laboratory-based tests that measure specific performance limitations of the vessel's design (Skibo 1992; Kilikoglou *et al.* 1998; Tite *et al.* 2001). While these studies provide important evidence for mechanical boundaries, they can be misleading, because they encourage archaeologists to think of the cooking pot as a homogeneous vessel type that is unchanging and formulaic (Woods 1986). In fact, the variety of cooking pots found suggests that there is more to these vessels



Figure 10.1. Floor plan of House A.1, Papadiokampos. Drawing A. Stamos.

than just their measurable properties. By using a holistic approach to ceramic studies and examining cooking pots in their environmental and archaeological contexts, archaeologists can learn more about how people used these vessels to prepare food. This approach incorporates the examination of the vessel's morphology, fabric studies and an experimental programme that mimics the vessels in both shape and fabric to detect probable pathways of production and use. This paper focuses on the experimental aspect of cooking. While the breadth of the discourse on experimental archaeology is extensive, and this paper contributes to it, we focus on the experiential aspects of what it means to prepare food (Outram 2008).

Late Minoan I Papadiokampos, East Crete

Papadiokampos was built on a small coastal plain occupying a narrow promontory separating the Bays of Mirabello and Sitia in East Crete. Chrysa Sofianou and the Twenty-fourth Ephoreia of Prehistoric and Classical Antiquities first explored the site in 2004 and continued with the support of the INSTAP Study Center beginning in 2007. Excavations in four parts of the site have revealed three main phases

of occupation beginning in Middle Minoan II, followed by massive rebuilding early in the Neopalatial Period, and again after the Thera eruption at the end of Late Minoan IA. Parts of four houses have been excavated from this final Late Minoan IB phase of the town, after which the site appears to have been largely abandoned.

The archaeological site: Papadiokampos House A.1

During the early Neopalatial Period at Papadiokampos, House A.1 was built on the western outskirts of the settlement (Sofianou and Brogan 2008; Brogan *et al.* 2011a; Brogan *et al.* 2013). It is a well-preserved, two-storey, rubble and mud-brick building located directly on the coast (Fig. 10.1). Excavation in House A.1 through the 2009 season had revealed nine rooms on the ground level with a staircase leading to a similar number of rooms on the upper storey. Based on the bioarchaeological remains and the ceramic studies, Sofianou and Brogan argue that its inhabitants were engaged in crop processing, fishing and food preparation activities (Sofianou and Brogan 2008; Brogan *et al.* 2013). The large quantity and vast size range of limpets, top shells and crab, identified by Mylona, suggests

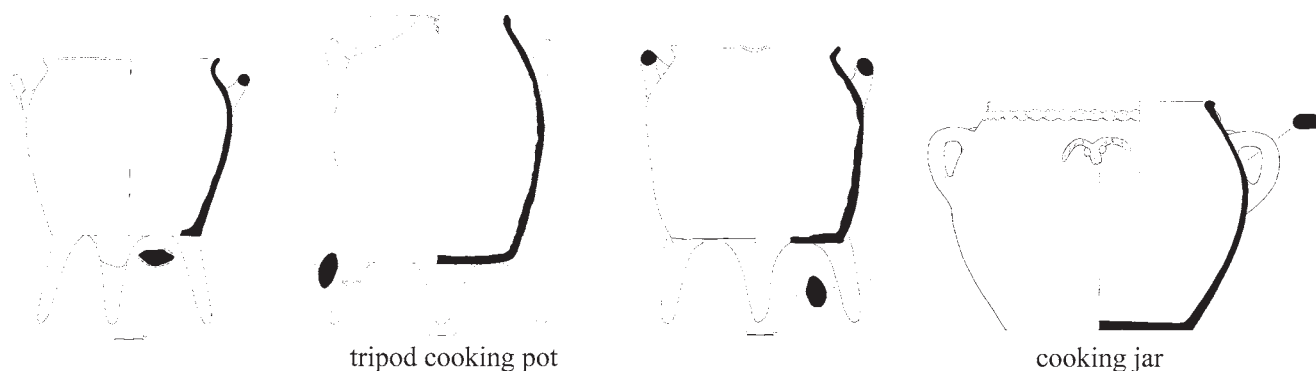


Figure 10.2. LM IB cooking pots from Papadiokampos. Drawing K. Chalikias and J. E. Morrison.

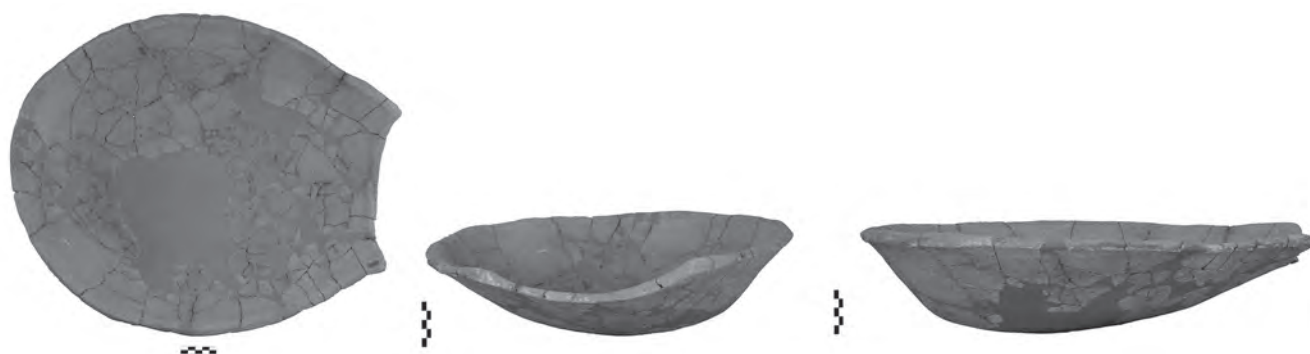


Figure 10.3. LM IB cooking dish from Papadiokampos, Photograph Ch. Papanikolopoulos.

that the individuals preparing food in House A.1 collected a large part of their sustenance from the shallow coastal waters nearby. Remains of olives, grapes, figs, almonds and legumes have also been identified, and would have been available for cooking and consumption (Evi Margaritis, personal communication, 2007). As a side note, Margaritis proposes that the charred olive pits served as fuel for the cooking fires. At the time of the building's destruction, three cooking areas, each equipped with one hearth and at least one large vessel with the capacity to hold a meal for multiple individuals, were in use: one in the South Porch, and two on the ground floor, one in Room 5 and the other in Room 8. The artifact assemblage for each is unique, yet the archaeobotanical remains are similar.

The cooking pot assemblage of House A.1

In contemporary Cretan sites archaeologists find: tripod cooking pots; thin-walled, scoop-shaped, broad-spouted cooking dishes; jars; and circular shallow trays (Betancourt 1980; Barnard and Brogan 2003; Rutter 2004; Rutter and Van de Moortel 2006; Brogan and Hallager 2011). These vessel types are Pan-Cretan, but subtle differences in the

vessel morphology, the size and the medium-coarse fabrics used to produce them are regionally definable. Unlike sites with established pottery production workshops, such as at Mochlos, the Papadiokampos cooking assemblage is not homogeneous (Barnard and Brogan 2003; Brogan *et al.* 2011a, b). Each cooking pot is unique in size, fabric and method of construction (Figs. 10.2–10.3).

The cooking assemblage from the South Porch includes a cooking dish full of limpet shells, a tripod cooking pot, a medium-sized piriform jar, a strainer, a scoop and several cups (Figs. 10.2–10.3; Sofianou and Brogan 2008, 27–28, fig. 3; Brogan *et al.* 2013). Each of the cooking pots was produced out of a different fabric. For example, macroscopic fabric analysis by Morrison using a 10x and a 30x lens reveals that the cooking dish was made out of an orange-tan, sandy fabric with metamorphic inclusions; the tripod cooking pot was made out of an orange fabric with purple metamorphic inclusions; and the jar was made out of a red fabric with dark red, pink and occasionally blue-grey metamorphic inclusions.

The cooking areas in Rooms 5 and 8 are arranged in a similar fashion. Each room has a hearth, stone benches around the exteriors for people to sit, and adjacent pantries

that stored cooking pots, jugs, jars and cups. Room 5, the larger of the two, was used as a multipurpose room, whereas Room 8 was used solely for cooking and eating.

In Room 5, there is again the combination of a cooking dish, a spouted tripod cooking pot and a piriform jar (Figs. 10.2–10.3; Sofianou and Brogan 2008, 26–27; Brogan *et al.* 2013). The cooking dish is approximately the same size as the one found on the porch, but it was made from a coarser, red metamorphic fabric. A series of small stone mortars, minimal amounts of goat, pork and beef remains, as well as a substantial heap of discarded burned limpets, partially crushed top shells and crabs were found.

The cooking assemblage in Room 8 consists of a concentration of shellfish remains, various types of cups, amphorae, jugs and jars – one of which is warped due to over-firing by the potter, and decorated with the head of a horned animal (Fig. 10.2; Sofianou and Brogan 2008, 29–30; Brogan *et al.* 2011b, fig. 34; Brogan *et al.* 2013). At the time of destruction, Sofianou and Brogan speculate that someone was preparing seafood soup in this vessel, as it was found filled with top shell, limpets and crab fragments. Focusing on these cooking areas, an experimental cooking programme was developed to test how these vessel types could be used to prepare meals.

Experimental procedure

The experiment is organised into three phases:

- Phase 1: Production of cooking pots;
- Phase 2: Preparation of cooking pots for use; and
- Phase 3: Food preparation and cooking.

These phases are briefly described below. Since this volume primarily focuses on interpretative approaches to kitchen pottery as a tool to better understand past civilisations and human behaviour, Phase 3 is highlighted in this paper and only a summary reference to the first two phases is provided. The discussion of Phase 3 is divided into two sections: 1) *Le menu* and cooking pot morphology; and 2) The skill, the art, the technology and the technique of cooking.

Phase 1: Production of cooking pots

The methodology used to produce the pots is based on results from multiple experiments that focused on various aspects of pottery production conducted in Crete over the past decade. These include replicating Minoan ceramic fabrics (Morrison and Archambeault 2004; Moody *et al.* 2012) and installing and producing small vessels on a replica of a Late Minoan potter's wheel (Evely and Morrison 2010). This collection of work is made possible by the on-going analysis of Minoan ceramics, the ethnography of



Figure 10.4. Production of LM I cooking pot replicas using a potting technique called “coil and wheel-fashioning”. Photograph S. Johnson.

pot making and Morrison's experience as a professionally trained potter.

After examining the manufacturing details of the archaeological material in House A.1 and experimenting with a replica of the Late Minoan potter's wheel using the local clays from Mochlos (Evely and Morrison 2010; Morrison 2010), Morrison determined that the tripod cooking pot and jars were most likely produced using a potting technique called “coil and wheel-fashioning” (Courty and Roux 1995). To replicate these Late Minoan IB vessels, Morrison used this technique (Fig. 10.4). In addition to this potting technique, the Minoan potters also produced cooking pots using moulds. The water-wiped interior and rough textured surface on the exterior of the archaeological cooking dishes suggest that the vessels were produced by pressing clay into some form of mould. Once the body of the vessel was formed, a coil was added to create a rim that is smoothed into the interior of the wall. To replicate the Late Minoan IB cooking dishes, Morrison used this mould-making method.

The clay used to produce the replicas for this experiment was collected from the modern village of Mochlos, and matches the cooking pots found in the Late Minoan IB levels at the nearby archaeological site (Barnard 2003; Day *et al.* 2003; Nodarou 2003; collaboration between Nodarou, Barnard and Morrison, 2004–present). The fundamental composition of Mochlos clay (earthenware with metamorphic inclusions) is similar to those unearthed at Papadiokampos and in other areas of Crete (Betancourt 1980; Moody 1987; Haggis and Mook 1993; Barnard 2003; Rutter and Van de Moortel 2006; MacGillivray *et al.* 2007; Brogan *et al.* 2011a, b). Since the fabric studies of the Papadiokampos material are not yet completed, we decided to use the Mochlos clay to produce the replica cooking pots for this experiment. The production of the replicas took place by using a kick-wheel that was installed at the

INSTAP Study Center for East Crete. Due to high winds it was too dangerous to have an open firing, so a modern pizza oven and an electric kiln in Pachia Ammos were used to fire the vessels.

Phase 2: Preparation of the cooking pots for use

There is considerable ethnographic evidence on preparing cooking pots for cooking. However, how ancient people might have prepared a cooking pot is not always obvious in the archaeological record (Skibo 1992). Chemical residue analysis of Late Minoan I lamps from Mochlos by Evershed *et al.* (1997) indicates that these vessels contained or were lined with beeswax. The beeswax could have been used as fuel, or to make their ceramic fabric less porous. At Mochlos such lamps were made in a similar fabric to the cooking pots; might wax coatings also have also been used to line cooking pots to enhance their performance?

Such practice may be paralleled in the archaeological record (see Cramp and Evershed this volume, for beeswax residues attested in late Roman and late Saxon/early Medieval cooking pots) and is attested in contemporary ethnographic practice: in Jordan women coat cooking pots fired between 600° and 800° C with beeswax to make them less porous. This improves their ability to hold liquids and retain heat (Alyounis family in Jordan, personal communication, 2010). It was, therefore, decided to coat the interiors of two cooking dish replicas – fired in the pizza oven at temperatures not above 800° C – with beeswax, while one was left untreated. Olive oil, a well-established product available during the Bronze Age and a well-known modern cooking ingredient in the Mediterranean, was massaged into the interior walls of the remaining vessels before they were used for cooking.

Phase 3: Food preparation and cooking

As a professionally trained chef, Alyounis was able to create and prepare a range of foods that might mimic Late Minoan flavours by using foodstuffs that would have been available during this particular time period. Our list of basic cooking ingredients comes from macroscopic bioarchaeological remains from Late Minoan I contexts across Crete, and residue analysis of stone tools and ceramic vessels. Environmental and climate reconstructions for the island during the Bronze Age, as well as iconographic representations and Linear B hieroglyphs of foodstuff were also referenced (Moody 1987; Dumas 1992; Tzedakis and Martlew 1999; Tzedakis *et al.* 2008; Andreadaki-Vlaziaki 2008; Moody 2012).

To test how the occupants of House A.1 could have used the tripod cooking pot, cooking dish and jar to prepare seafood, we collected similar species of shellfish,



Figure 10.5. Replicas of LM I cooking pots used for experimental cooking. Photographs Ch. Papanikolopoulos.

e.g. limpets, *Patella* sp., and top shells, *Monodonta turbinata*. Additional foodstuffs, used either to season the food or as complementary food dishes, were collected from local organic stores and butcher's shops.

Le menu and cooking pot morphology

Cooking pot morphologies have inherent characteristics associated with vessel use. For example, the tripod cooking pot has three attached legs that elevate its bowl-shaped body above the ground. Archaeologists can imagine that this design allows the cook to easily regulate heat by placing the needed fuel directly under the vessel between the legs, in order to prepare soups or stews without the constant fear of burning the ingredients. A more open vessel, such as a cooking dish, whose shallow, bowl-shaped body could be elevated above the hearth, turned upside down, or nestled directly into coals to have direct contact with the heat, creates a large and hot surface that is ideal for roasting, sautéing or baking foods. To test such assumptions about how vessel morphology and use correlate, the cooking pot replicas were given to Alyounis (Fig. 10.5). Based on his understanding of how heat and time can be used to prepare food in these types of cooking vessels, a cooking plan was designed (Fig. 10.6).



Figure 10.6. Organising and cooking on the hearth. Photograph S. Johnson.



Figure 10.7. Cooking lentils. Photograph S. Johnson.

In the replica cooking dishes, three separate food dishes were prepared and flat bread with saffron and coriander seeds was baked. In one vessel a seafood soup full of top shells, a few limpets and a crab was simmered and flavoured with olive oil, leek, garlic, honey, grape syrup and red wine vinegar. In the second, lamb was sautéed with mustard and coriander seed, garlic and leek, and finished off in a Cretan red wine reduction. In the third, various cuts of pork, mainly bacon and pancetta, were sautéed and seasoned with leek, garlic, mustard seed and grape syrup (Moody 2012). The fourth, a cooking dish, was turned upside down on supports (to raise it off the coals) and used to bake flat bread on its exterior, domed surface.

Previously prepared dishes were reheated in the tripod cooking pots. The radiated heat created by the small mounds of coals placed between the legs allowed the bodies of the pots to slowly warm. In one tripod cooking pot cuttlefish cooked with ink was warmed, and in the other octopus simmered in beer with leek and garlic (Moody 2012).

For the jars, Alyounis alternated between cooking directly on the coals and elevating the vessel above the coals on supports. In one jar liver, onions and garlic in water sweetened with honey and puréed chestnuts was simmered. In the other, lentils with onion, garlic, honey, coriander was prepared and topped off with fresh olive oil (Fig. 10.7; Moody 2012).

The skill, the art, the technology and the technique of cooking

Subtle differences between the skill, the art, the technology and the technique of cooking became apparent as the Late Minoan IB cooking pot replicas were placed on the hearth. To begin, a rectangular hearth measuring 2 m by 1.5 m was

built outside in the Kentro garden on a windless December evening with a temperature of approximately 10°–17° C. The hearth's centre was slightly dug out, the area around it raised, and the interior filled with olive wood clippings and charcoal. (Future experiments are scheduled to compare how this fuel type compares to crushed olive pits, to better interpret Margaritis' observations of the bioarchaeological remains from House A.1). Once the fuel was lit, it took approximately 45 minutes for the coals to attain the correct temperature for cooking. During this time, the pots were placed around the hearth for preheating. Preheating the pots protected them from cracking, as well as allowed the beeswax to seep deeper into the walls of the coated cooking dishes.

To cook on the hearth, Alyounis and Morrison moved the coals into the corners of the hearth to access the heat. To use the heat efficiently, the cooking dishes and jars were elevated on makeshift tripod stands using the sides of the hearth with a brick opposite the corner. Alyounis made the point that when one prepares multiple food dishes, timing is everything. For example, he began working with the large jar to prepare the lentils, and then mixed the dough for the flat bread. As the dough was rising, he elevated the small jar over a much cooler area of the hearth to slowly cook the liver. Alyounis' comment that, to his palate, "If you do not cook liver slowly, it tastes and has the texture of shoes", emphasises the important relationship between food, time and cooking temperature from a cook's perspective. He then placed the two cooking dishes into the much warmer corners of the hearth opposite the jar. In one he began preparing the seafood soup; the other was warming to sauté the pork. Once the seafood soup was finished, it was poured from the broad spout into a metal bowl, covered with foil and placed by the coals to keep warm. Once empty, the cooking dish was reheated to cook the lamb. During this

COOKING UP MINOAN TASTES ON THE HEARTH				
Food dish	Cooking pot type and capacity	Time on 24 hour clock	Cooking details	Approximate cooking time
lentils	jar (3 litres)	17:13	The pot with lentils is placed on the hearth.	2 hours
		17:47	The liquid is boiling.	
		18:06	More water is added.	
		19:12	The pot is removed from the hearth.	
seafood soup	cooking dish	17:30	The pot is placed on the hearth.	1 hour and 15 minutes
		17:34	The seafood is added to the pot.	
		17:40	The crab is a red color.	
		17:47	The liquid is boiling.	
		18:43	The pot is removed from the hearth.	
lamb	cooking dish	17:47	The pot is placed on the hearth.	45 minutes
		17:50	The lamb is added to the pot.	
		18:04	The red wine is added to the pot.	
		18:32	The pot is removed from the hearth.	
liver	jar (1.5 litres)	18:10	The pot is put on the hearth.	1 hour and 20 minutes
		18:13	Olive oil is added to the pot.	
		18:34	Liver is added to the pot.	
		18:52	The liquid is simmering.	
		19:31	The pot is removed from the hearth.	
pork	cooking dish	18:43	The pot and the pork is put on the hearth.	45 minutes
		18:53	The meat is turned.	
		19:21	The pot is removed from the hearth.	
octopus (reheating)	tripod (1.25 litres)	19:06	The pot and the octopus is put on the hearth.	45 minutes
		19:30	The liquid is boiling.	
		19:40	The pot is removed from the hearth.	
cuttlefish (reheating)	tripod (1.25 litres)	19:06	The pot and the cuttlefish is put on the hearth.	45 minutes
		19:30	The liquid is boiling.	
		19:40	The pot is removed from the hearth.	

Figure 10.8. Cooking up Minoan tastes on the hearth.

time, the dough was shaped into thin pieces and placed on the underside of the upside-down cooking dish to bake. While the lamb and the liver finished cooking, the tripods were used to reheat the octopus and the cuttlefish.

Conclusions

Cooking lessons learned: relating the cooking experiment to the archaeological evidence

Cooking is complex. One has to organise simultaneously time and heat in order for food to be prepared properly in ceramic cooking pots. The most striking observation from

this exercise is that the entire process – from creating the fire to eating the food – took about three hours (for the breakdown of cooking times for each food dish see Fig. 10.8). According to Alyounis, the two-hour timeframe for cooking was a little more time than what would be needed to prepare these foods in a modern kitchen equipped with gas fuel and the same number of cooking pots.

To control the heat when preparing a particular food dish, the coals were moved around the hearth during various stages of the cooking process. For example, to prepare the lamb in a red wine reduction the meat must first be braised and then simmered in wine until enough liquid has evaporated to create a flavourful sauce. To accomplish this, the meat was braised in the cooking dish

using a high heat, which was created by placing the vessel on supports over a large mound of coals. Once the meat was properly braised, the cooking dish was gently removed from the supports, exposing the coals underneath. It was then possible to lower the temperature of the heat by removing half of the coals. The dish was placed back onto the supports and the lamb finished cooking in the red wine as it reduced.

Additional factors used to control the heat included preheating the cooking pots, placing tin foil over the tops of the jars and the tripod cooking pots to act as lids to retain the heat, and evenly heating the food by stirring and turning it in the pots with wooden spoons and spatulas. Most of these kitchen tools (*e.g.* spoons, spatulas and lids) made from organic materials would have been available to the Minoan cook, but due to poor preservation have not been found in the Minoan/Aegean archaeological record.

Interestingly, the tripod cooking pots and jars were so efficient at limiting the heat to their bellies that it was possible to touch the rims and the handles of the vessels with minimal amounts of discomfort. The only time an oven-mitt was needed was when the cooking dish was moved and the seafood soup was poured from its spout. In fact, the tripod pots and the jars are so heat efficient that for at least 30 minutes after they were removed from the hearth the food remained warm. Yet food left in the cooking dishes cooled quickly. This sheds light on assumptions about the types of cooking pots that could be used as serving containers (Soles 2003; Rutter 2004). Based on experience gained from this experimental model derived from the evidence of Papadiokampos House A.1, we believe that people living in the Late Minoan IB period could easily enjoy a warm meal around the hearth, or move the tripod cooking pots and jars to other areas of their house to eat if they so desired.

Post-cooking and eating observations

Splatter markings from fatty substances, honey, cuttlefish ink, red wine and burned food stained the interiors, rims and spouts of the vessels. After cleaning the pots with our bare fingertips and fresh water, most food stains were removed but the surface colour of the pots remained slightly darker. Only the ink and fat from the meat could still be discerned by eye. Subtle discolouration from the fire was also noticeable on the undersides of the cooking dishes and on a few tips of the tripod feet, but there was none on the jars.

Archaeologists have noted and used these sorts of use-wear marks on Late Minoan cooking dishes and tripod cooking pot to identify vessels as cooking pots (Betancourt 1980; Martlew 1983; Mook 1993; Barnard and Brogan 2003; Rutter 2004; Rutter and Van de Moortel 2006). However, our

experience with the House A.1 archaeological cooking pots suggests that use-wear analysis does not always correctly identify cooking pots. Like the experimental cooking pots, the Papadiokampos jars did not display use-wear from a fire even though the archaeological context clearly indicates the vessel was used for cooking. If archaeologists continue to identify cooking pots as those only with fire marks, then perhaps many types of cooking techniques and technologies will remain unidentified.

Interestingly, the cleaned cooking pots retained the smell of the cooked food. This allows us to imagine that perhaps the people living during the Late Minoan period kept certain pots for specific food items, such as those used to prepare seafood, but this might not necessarily be the case. Clearly, smells and ideals of sterilisation are cultural and what would be unpleasant or unclean to us might not have bothered the Minoans. Alyounis proposed that boiling water in the cleaned cooking pots would remove much of the smells from the previous meals. This would sterilise the pot enough to prevent illness from spoiled food residues. In the subsequent round of cooking experiments pots were cleaned by water boiling, and the smells and tastes of previous foodstuffs were not detected.

The amount of food one eats is also linked to cultural norms of food consumption and the types of food one eats. To our modern palate the food was rich and filling, even though it had very simple flavours. It was impossible to eat large quantities of the dishes prepared. In fact, the replica cooking pots are fairly small, no more than 2–3 litres in size, yet we fed over eight adults blessed with healthy appetites with leftovers for the next day. Can our cooking and eating experience using the Papadiokampos House A.1 cooking experiment as a model shed light on Late Minoan IB food consumption and household organisation for the inhabitants of Papadiokampos or in other areas of Crete?

The Papadiokampos cooking pots are at least twice as large as the replicas, *e.g.* approximately 6–8 litres. Based on our experience, this suggests that the people living during the Late Minoan IB period could have prepared large portions of food and fed many individuals during a single meal. There are, of course, alternative scenarios to consider. For example, perhaps the cooks of Papadiokampos did not always use their cooking pots at their full capacity. Perhaps they prepared more watery soups than the thick, stew-type dishes Alyounis prepared, making it possible for an individual to consume more food than we did in a single meal. Perhaps they prepared more food than they would consume in a single meal, cooking only once a day (or even once every few days) to lessen their daily domestic duties or the fuel consumption that was needed to create and maintain a hearth fire. It is also possible that they only ate cooked food once a day, every other day, or even once a week, and supplemented their diet with dried,

smoked or pickled food and foods preserved in other ways. Taste in food, diet and concepts of consumption and even individuals' digestive systems are also cultural, and we might not be able to speculate about eating and cooking practices at this level, but it is worth pondering to deepen our understanding of Minoan domestic life in general.

A noticeable difference between cooking in the various types of cooking pots is how one sees the food. In tripod cooking pots and jars it is difficult to see into the pot to judge whether or not the food is fully cooked. You have to either spoon the food out to see, or use your nose to smell the food and your hands to feel its texture to know if it is ready. In the broad, shallow body of a cooking dish the food is exposed and clearly visible.

In tripod cooking pots and jars, the food is cooked in the belly of the pot, making the evaporation of its natural juices and added liquids fairly slow. It would be difficult to deep fry or sauté a large quantity of foods quickly in these sorts of pots without it becoming saturated with oil. Cooking dishes, however, are perfect for sautéing, frying, baking bread and creating soups or sauces that have a slightly thicker texture. Their broad spout is also perfect for pouring soups and sauces into serving containers. We must emphasise, however, that cooking dishes are much more fragile and therefore more difficult to make, move, cook with and clean than other Minoan cooking vessels. One must be extremely careful or they crack. In fact, several cracks appeared on the cooking dishes during production and use; we patched these using ancient methods and continued to cook.

Producing pottery and cooking are both sensory experiences. People involved in these sorts of activities use their eyes, finger-tips, ears, nose and tongue to "listen" to the materials they are manipulating to produce a pot, or prepare a meal. The more one pots and cooks, the more sensory knowledge is gained, allowing one to intuitively problem-solve through the production and use of each pot. These, however, are hidden processes that cannot always be detected if one only examines the ancient object. This lack of information could lead the ceramic specialist to inaccurate conclusions when addressing technological problems in antiquity, and even more so if the ceramic specialist is not familiar with how to produce or use a pot. It is for this reason that experimental work relating the human side of pot-making to ancient technologies, rather than an approach that only uses the material and mechanical properties of the vessel to define technologies, must be conducted.

The cooking areas of House A.1 exhibit a cultural cohesion of domestic organisation in terms of collected foods, ceramic cooking equipment, use of indoor and outdoor space, as well as direct cooking technologies within Late Minoan I society. Yet, the differences between cooking

areas demonstrate the uniqueness of individual working and perhaps even living spaces. By using an experimental approach incorporating ceramic studies, archaeology, biology, ecology and ethnography, we were able to use the contextual information of these domestic cooking scenes to discuss everyday activities. It is important to emphasise that this is one of many ways to experience archaeological interpretations. We are by no means claiming that how we cooked, cleaned and enjoyed the food is "Minoan", but we do believe that this sort of experiential, cross-cultural study is fundamental to testing our archaeological assumptions about how ancient people lived.

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READING THE RESIDUES: THE USE OF CHROMATOGRAPHIC AND MASS SPECTROMETRIC TECHNIQUES FOR RECONSTRUCTING THE ROLE OF KITCHEN AND OTHER DOMESTIC VESSELS IN ROMAN ANTIQUITY

Lucy J. E. Cramp and Richard P. Evershed

Introduction

The political and trade networks of the Roman Empire were extensive, stretching from the westernmost fringes of the British Isles as far as India, China and Japan. Alongside trade and population movement spread novel commodities, practices and ideas, evidence for which may be extracted from archaeobotanical remains, archaeozoological assemblages, ancient artefacts, and the organic residues preserved on or within them. Ancient kitchen vessels potentially came into contact with a wide range of products, including various animal resources (*e.g.* meat, fat and milk), plant oils, roots, fruits and leaves, herbs, spices and alcoholic beverages. Other organic products, such as resins or glues, may also have been present, not necessarily as vessel contents in their own right, but to enhance or restore function. The investigation of the organic residues from these products, often invisible to the naked eye, can therefore significantly advance our knowledge of products exploited, how and why they may have been mixed, the vessel forms or fabrics associated with various commodities and technological choices being made.

In this review, we consider some of the resources believed to have been of particular economic and/or cultural significance in the Roman period, evaluating

the current status of the field regarding the possible identification of these substances in organic residues. There follows a discussion of some of the wider issues in Classical antiquity that have been examined and developed via such studies.

Technological approaches

Macroscopic residues adhering to pottery or other artefacts are welcome, but often rare, finds in the archaeological record. Investigations of the chemical composition of fragments of vessel linings (*e.g.* Heron and Pollard 1988; Colombini *et al.* 2005a), in situ vessel contents (*e.g.* Evershed *et al.* 2004; Ribechini *et al.* 2008a) and substances applied to mummified and other ritual artefacts, which are exceptionally well preserved in the arid conditions of North Africa (*e.g.* Tchaplai *et al.* 2004; Clark 2006), have allowed the compositions of many of these substances to be reconstructed. However, organic residues may also be identified, often with a higher degree of frequency, absorbed into the fabric of ceramic vessels where biomolecules are well protected from microbial or physical decay (Heron and Evershed 1991). Lipid (*i.e.* fat or oil) components tend to be best preserved, due to their

hydrophobic properties. However, particularly in more arid preservation conditions, carbohydrates and proteins (for example from gums or glues) may also be preserved in organic residues. Organic molecules may be extracted from visible crusts or crushed pottery fabric, using chemicals selected for the class of organic components under investigation. Larger molecules, biopolymers such as polysaccharides or proteins, may require hydrolysis to release their simple sugar or amino acid components, prior to analysis usually using a combined separation and characterisation technique, such as gas chromatography/mass spectrometry (GC/MS) or liquid chromatography/mass spectrometry (LC/MS). Tiny flakes of macroscopic residues may be analysed intact through the combination of GC with a pyrolysis unit (py-GC) which volatilises components of intact and non-volatile organic materials through thermally induced desorption and/or cleavage of chemical bonds.

GC is a method suitable for the separation of relatively volatile and lower molecular weight compounds, including the majority of lipid components, based upon differences in boiling point and polarity of different compounds. For less volatile components, high performance liquid chromatography (HPLC), where the analyte is carried in a liquid rather than gas phase, can be used as the separation technique. These chromatographic techniques only separate and quantify components within a mixture and are usually combined with a mass spectrometer, which replaces the detector. Each component, on reaching the MS, is ionised and in electron ionisation (EI) mode, fragmented, producing distinctive patterns of fragment ions potentially unique to each compound. Chemical ionisation (CI) and atmospheric pressure chemical ionisation (APCI), which are less widely used techniques for archaeological residues, ionise molecules through proton transfer from an ionised gas such as methane. This technique produces less fragmentation and more stable pseudo-molecular ions ($[M + H]^+$).

Interpreting the findings

Once the biomolecules within a residue have been structurally identified, the distributions – or “fingerprints” – of components may be compared with modern and artificially degraded reference materials. Only where unique biomarkers, or distributions of biomarkers, are preserved can positive identifications of substances be made, and it is worth remembering that often the majority of components remaining in a degraded ancient residue are common to a wide variety of sources. It may therefore be necessary to use more selective and sensitive methods of mass spectrometry to identify low

concentrations of more specific biomarkers. In addition, the isotopic composition of selected components may be exploited to assign more specific origins to residues. The findings that result from the investigation of absorbed or visible organic residues must be subjected to careful interpretation. Many organic residues are likely to reflect a mixture of sources, either combined together or as an accumulation of substances from the lifespan of the object. There is, furthermore, a high likelihood that those products characterised by components with high susceptibility to rapid degradation and loss, or that resist the laboratory extraction technique, will have low or in-visibility in the findings. Other commodities may also be over-represented at the expense of others; for example, processing fat-rich animal products is likely to result in higher concentrations of lipids recovered compared with waxy or starchy plant products. Nonetheless, where mixed, over-printing rather than complete masking of one signature with another would be expected (Charters *et al.* 1995; Evershed 2008).

Whilst absorbed residues from ceramic fabrics are generally more widespread and better preserved than macroscopic residues, allowing larger-scale comparisons of residues from different groups of artefacts, the rates of preservation may be influenced not only by localised burial conditions, but by the types of pottery and the manner in which pots were used. Pottery in use in the Roman period includes a wide range of vessel forms and fabrics, including fine, slipped and very hard-fired, even semi-vitrified, wares (Tomber and Dore 1998), which may significantly influence lipid absorption due to a less-porous fabric. Moreover, vessels used for storage or serving may be less likely to absorb such quantities of lipid than cooking pots, since heat is known to mobilise, and hence facilitate, the absorption of lipid components into the vessel fabric (Charters *et al.* 1993; Charters *et al.* 1997; Evershed 2008). It should also be recognised that the findings from absorbed pottery residues represent only those products that come into contact with these artefacts. Hence, products cooked directly over fires or mixed or processed in non-ceramic containers, and of course those not cooked or processed at all, will not be revealed.

Commodities of importance in the Roman Empire

Animal products

Although a variety of domesticated and wild animals are known to have been exploited in Classical antiquity, the major domesticates are limited to four species: cattle, sheep, goat and pig (*e.g.* King 1984; 1999; Garnsey 1999).

As such products possess a relatively high fat content, and are often cooked prior to consumption, animal fats tend to be the most prolific residue category detected in cooking pots from earliest pottery through to the Medieval period, although in actual fact the contribution of meat to the average diet in Classical antiquity is believed to have been relatively minor (Wilkins 1995, 104; Garnsey 1999, 16). Fresh animal fats are characterised by a high abundance of triacylglycerols (TAGs), which are composed of three fatty acids esterified to a glycerol backbone. A high proportion of these fatty acids contain 16 and 18 carbon atoms, which results in a characteristic distribution of triacylglycerols in the range C_{48} (e.g. 16 + 16 + 16) to C_{54} (e.g. 18 + 18 + 18). When triacylglycerols degrade, the free fatty acids are released in a stepwise fashion. Therefore degraded animal fat residues are typically characterised by traces of intact triacylglycerols, di- and mono-acylglycerols, and high abundances of free fatty acids, dominated by the C_{16} and C_{18} homologues. Despite relatively high concentrations of the monounsaturated C_{18} fatty acid in fresh animal fats, the highest abundances of fatty acids in an archaeological residue are saturated; this is due to the higher susceptibility of unsaturated fatty acids to oxidation and loss, which increases with the degree of unsaturation, such that tri- and polyunsaturated fatty acids are rarely, if ever, detected in ancient lipid extracts.

Although animal fats are relatively easy to identify based upon the above criteria, classifying animal fats of different origins requires further analysis. Whilst differences in fatty acid composition of different species or tissues may exist when fresh, degraded fats can be impossible to distinguish. For instance, dairy fats contain high abundances of TAGs comprised of shorter-chain fatty acid components (C_{12} – C_{14}). However, TAGs composed of longer-chain homologues are more resistant to hydrolysis, presumably due to steric hindrance and, once released, shorter-chain free fatty acids are also more soluble in water compared with longer-chain components. Since lower molecular weight TAGs and shorter-chain free fatty acids are therefore often missing, the lipid composition of a degraded dairy fat may therefore closely resemble adipose fat. Similarly, although porcine fats tend to have narrower triacylglycerol carbon number distributions than ruminant fats, this is rarely preserved in archaeological residues (Dudd *et al.* 1998).

Fortunately, the stable isotopic signature of surviving fatty acids, which reflects their formation via different biosynthetic or metabolic pathways in different species or tissues, is preserved over millennia. By plotting the ratio of $^{13}\text{C}/^{12}\text{C}$ (relative to an international standard and expressed in parts per thousand (‰) of the two major fatty acids ($C_{16:0}$ and $C_{18:0}$) that survive in archaeological animal fats, ruminant fats can be separated from non-ruminant fats and, within the latter, fats of adipose origin (e.g. meat)

from dairy origin (Dudd and Evershed 1998; Dudd *et al.* 1999; Evershed *et al.* 2002; Fig. 11.1). Unfortunately, it is currently very difficult to separate fats deriving from the various ruminant species (e.g. sheep/goat/cow), although in cases of exceptional TAG preservation, recent work has succeeded not only in the highly sensitive detection of lower molecular weight TAGs, but in separating milks from various species by the use of nanoelectrospray and Fourier Transform MS to determine the precise fatty acid composition of TAGs (Mirabaud *et al.* 2007; Garnier *et al.* 2009). Further, isotopes of hydrogen ($^2\text{H}/^1\text{H}$) have demonstrated potential to distinguish horse milk and carcass fats (Outram *et al.* 2009). This is based upon seasonal differences in the deuterium (δD) isotope values of precipitate in mid-continental regions (Rozanski *et al.* 1993), including the Eurasian steppe, where this approach has been applied to archaeological residues (Outram *et al.* 2009). Whereas horse carcass fats will reflect the mean annual δD value of water and diet, mare's milk, produced in summer, will display an enriched summer signal.

Marine products and garum

Marine products are likely to have been exploited in Roman antiquity, both at coastal sites and further inland, since trade in commodities such as oysters and *garum* is well known (e.g. Curtis 1991). Both freshwater and marine lipids are characterised by high abundances of long-chain polyunsaturated fatty acids, such as eicosapentaenoic acid (EPA; $C_{20:5}$) and docosahexaenoic acid (DHA; $C_{20:6}$). However, these components are extremely labile and therefore susceptible to rapid degradation and loss, such that they will not be recovered in archaeological marine-derived lipid residues (Fig. 11.2a). The isotopic composition of the $C_{16:0}$ and $C_{18:0}$ fatty acids in marine lipids is relatively enriched (Cobabe and Pratt 1995; Evershed *et al.* 2002; Copley *et al.* 2004; Craig *et al.* 2007, 2011; Cramp and Evershed 2014), and that from freshwater fish relatively depleted (Craig *et al.* 2007; Outram *et al.* 2009; Craig *et al.* 2011; Cramp and Evershed 2014), compared with values deriving from a terrestrial origin (Fig. 11.1). Therefore, where a residue is of pure aquatic origin, the values should be separable from terrestrial species. However, where mixing occurs in pottery, there will be an integrated isotopic signature. Due to the relatively low abundance of $C_{18:0}$ fatty acid in aquatic organisms compared with the major terrestrial species, only a low contribution of ruminant fat would be required in order to significantly shift the $\delta^{13}\text{C}_{18:0}$ values in a mixture to more terrestrial values.

However, recent work has demonstrated that stable biomarkers may be retrieved that are diagnostic of the precursor polyunsaturated fatty acids, even in the event

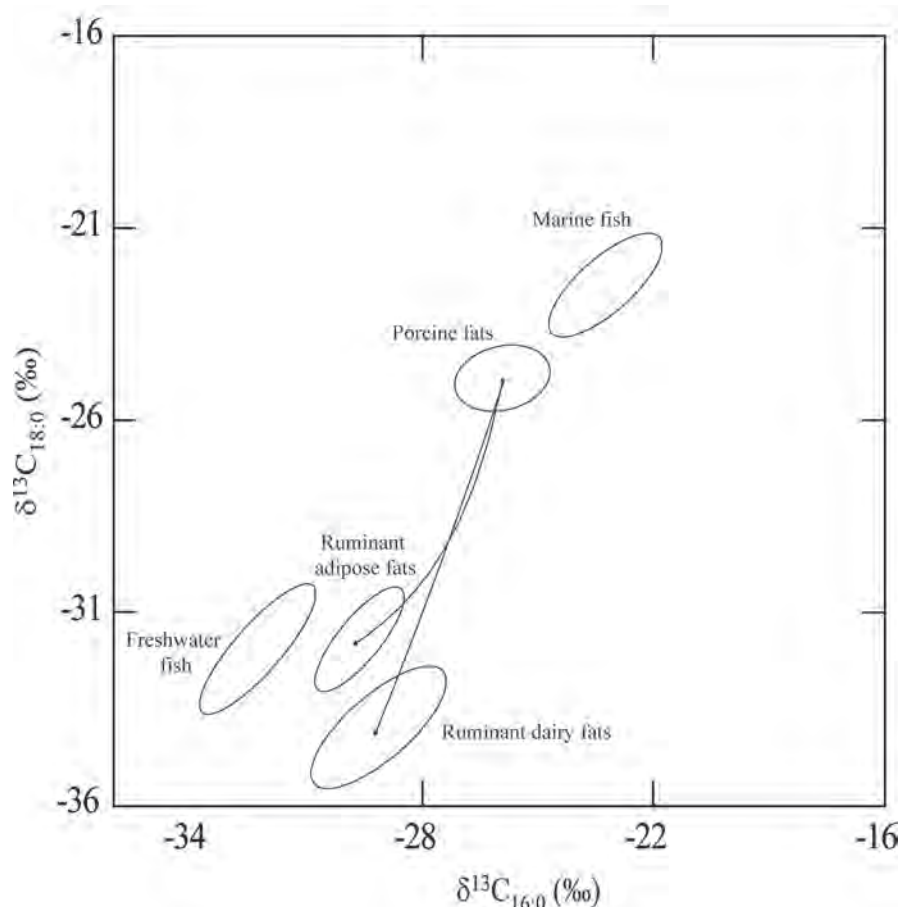


Figure 11.1. Plot of $\delta^{13}\text{C}_{16:0}$ against $\delta^{13}\text{C}_{18:0}$ with 1 s.d. ellipses deriving from modern reference data indicating where fats of different origins should lie (terrestrial faunal values from Copley *et al.* 2003; freshwater fish values from Outram *et al.* 2009; UK marine (fish, shellfish, crustacean and mammal) values from Cramp and Evershed 2014).

of mixing. For example, ω -(*o*-alkylphenyl) alkanolic acids (APAAs) are very stable compounds formed when polyunsaturated fatty acids are heated (probably in excess of 270°) in a clay matrix (Hansel *et al.* 2004; Evershed *et al.* 2008). These compounds retain the carbon chain length of the original fatty acid and therefore the detection of C_{20} and C_{22} APAAs provides evidence for the processing of products of aquatic origin (Fig. 11.2b). Dihydroxy acids provide evidence for monounsaturated components, with 11,12-dihydroxydocosanoic acid, originating from the dihydroxylation of $\text{C}_{22:1\Delta 11}$ (cetoleic acid) particularly diagnostic of marine lipids (Hansel *et al.* 2011; Hansel and Evershed 2009; Evershed *et al.* 2008; Fig. 11.2c). In addition, a third class of biomarker, isoprenoid fatty acids, is also diagnostic of marine fats and oils (Ackman and Hooper 1968). These components derive from phytol in marine algae, accumulating in organisms further up the food chain. The presence of the following isoprenoid fatty acids: 4,8,12-trimethyltridecanoic acid (4,8,12-TMTD);

2,6,10,14-tetramethylpentadecanoic acid (pristanic acid); and 3,7,11,15-tetramethylhexadecanoic acid (phytanic acid); may be observed in residues of marine origin (Hansel *et al.* 2004), although the latter may also be observed in ruminant milk and carcass fats (Vetter and Schröder 2011) and is not a marine biomarker when observed alone.

The fermented “fish sauce” known as *garum* was widely produced, transported and consumed in Classical antiquity and its identification in amphorae and other storage or culinary vessels could be of particular interest to Classical archaeologists. *Garum* was probably produced through the addition of salt and spices to fish viscera, which was left to ferment in the sun for a period of months, or through the heating of the fish in brine (Curtis 1991, 15). A relatively high fat content has been identified in reconstructed “*garum*” (Aquerreta *et al.* 2001) and the fatty acid composition would have contained high levels of long-chain polyunsaturated fatty acids found in unfermented marine products (Dincer

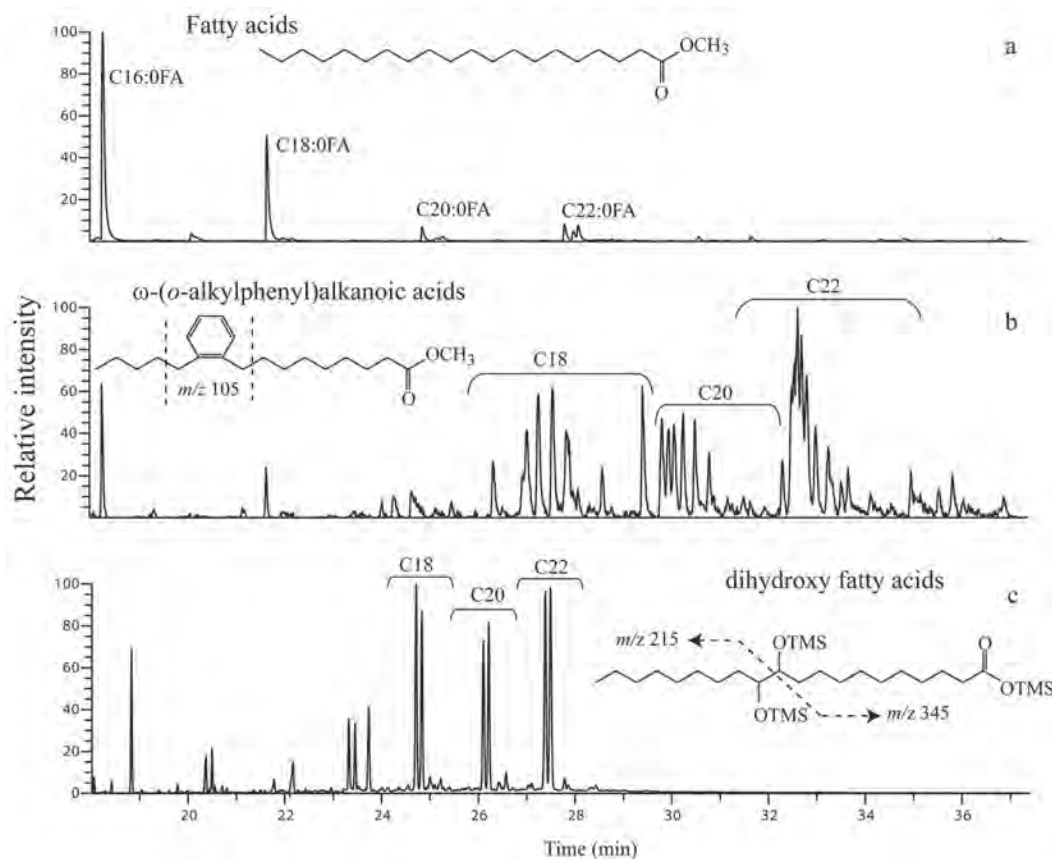


Figure 11.2. Gas or mass chromatograms from a Viking age degraded marine residue from Jarlshof, Shetland, showing: (a) the distribution of fatty acids (methyl esters) in the acid fraction; (b) mass chromatogram (m/z 105), showing distributions of C_{18} , C_{20} and C_{22} ω -(*o*-alkylphenyl) alkanolic acids (methyl esters); and (c) mass chromatogram with mass spectrometer operating in selected ion monitoring mode, showing *threo* and *erythro* isomers of C_{18} (m/z 215, 317 and M^+ 517), C_{20} (m/z 215, 345 and M^+ 545) and C_{22} (m/z 243, 345 and M^+ 573) dihydroxy fatty acids (trimethylsilyl esters).

et al. 2010). It is highly unlikely that the conditions required for the formation of APAAs would be met in production or storage vessels. However, if amphorae and *dolia* were used exclusively for *garum*, a likely possibility, the isotopic composition of the lipid residues would exhibit a strong marine-derived signal. Further, hydroxylated and isoprenoid fatty acids could also be preserved. Conversely, whilst the use of *garum* as an ingredient in domestic cooking vessels may generate APAAs, the likely use of *garum* as a flavour-enhancer for other commodities would probably result in a predominantly terrestrial stable carbon isotopic signature. The major challenge, however, would also be to ascertain the likelihood that marine biomarkers reflect the storage or processing of *garum* (e.g. fermented) rather than fresh marine products. To our knowledge, no investigations of the lipid composition of residues from vessels likely to have held *garum* have been performed to date; however, analyses of the amino acid composition of macroscopic residues from the bottom of *dolia* from a “*garum*” shop

in Pompeii have revealed a high glutamate (e.g. umami) content, similar to that in modern Asian and Italian fish sauce products (Smriga *et al.* 2010).

Plant oils and waxes

Literary and archaeobotanical evidence informs us that plant oils were widely exploited in the Classical world for a range of uses, including the culinary and the cosmetic, illumination and for personal hygiene. One of the earliest applications of gas chromatography for the analysis of ancient lipids involved an attempt to confirm the use of ancient amphorae to contain olive oil (Condamin *et al.* 1976); however, even 40 years later, this remains one of the more problematic substances to identify. In addition to olive oil, which could be produced in and traded from the Mediterranean and North Africa, other plant oils may have been available and utilised in Classical times, including species such as radish, castor, lettuce, moringa, safflower

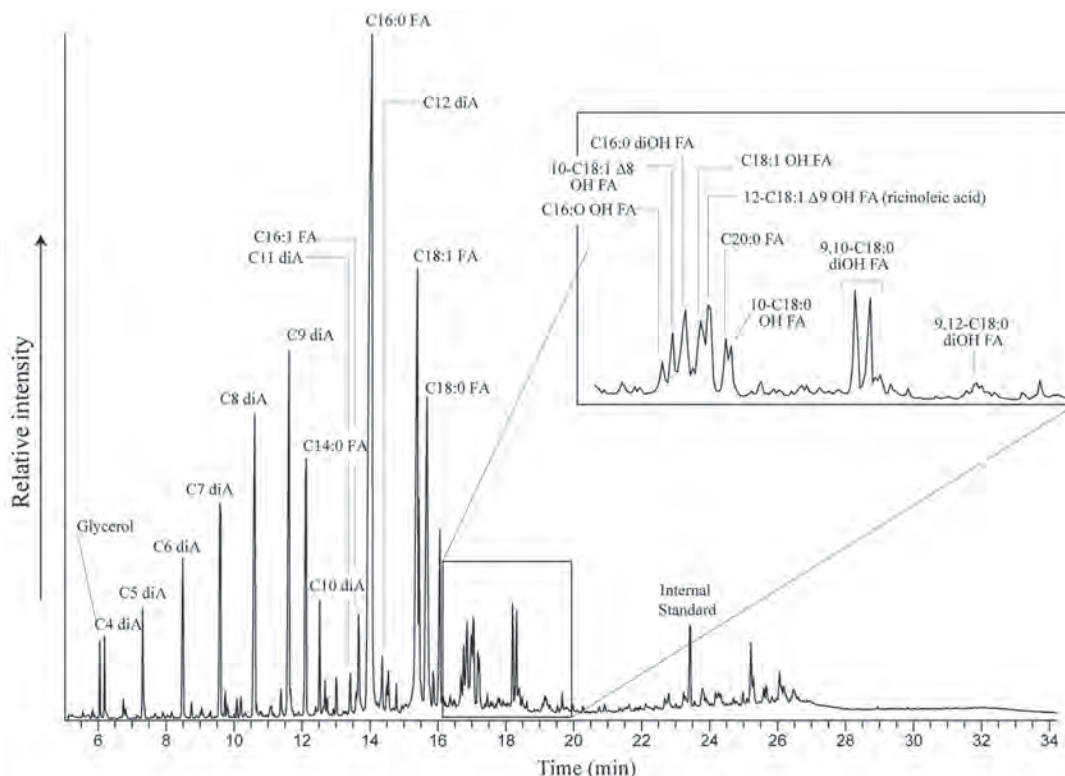


Figure 11.3. Gas chromatogram from a trimethylsilylated Romano-Egyptian mummy balm. The high relative concentrations of $C_{16:0}$ and $C_{18:1}$ fatty acids, along with a series of dicarboxylic acids and dihydroxy acids, indicate this balm contains plant-derived oil. Ricinoleic acid (inset) is a biomarker for castor oil. Key: CX diA – dicarboxylic acid with X number of carbon atoms; CX:Y FA – free fatty acid with X carbon atoms and Y degree of unsaturation. CX:Y OH FA – monohydroxy fatty acid with X carbon atoms and Y degree of unsaturation; CX:Y diOH FA – dihydroxy fatty acid with X carbon atoms and Y degree of unsaturation.

and sesame oil that are believed to have been produced in Ptolemaic Egypt (Serpico and White 2000a).

Most plant oils are characterised by high abundances of mono-, di- and triunsaturated fatty acids (Rossell 1991) and a relatively low concentration of stearic acid, one of the major components of animal fats. However, these unsaturated components are susceptible to degradation and loss and hence original fatty acid distributions will not be preserved (Aillaud 2001). Whilst the stable carbon isotope composition of plant oils has demonstrated that these products display enriched signatures, overlapping with non-ruminant animal products (Spangenberg *et al.* 2006; Steele *et al.* 2010), there is no indication that the carbon isotope composition of individual fatty acids from plant oils, stems or leaves is diagnostic of plant type, other than separating C_3 and C_4 species (Dungait *et al.* 2008; 2010; Woodbury *et al.* 1998). More specific identification of plant oil types therefore requires the identification of biomarkers that can be related to the original fatty acid composition of the source oil, and for this in itself to be diagnostic. The former presence of monounsaturated fatty acids can be revealed by the presence of biomarkers such

as α,ω -dicarboxylic acids, produced from the oxidative cleavage of a double bond and dihydroxycarboxylic acids where hydroxylation occurs at the position of the double bond. These components preserve the double bond position and, for the latter, carbon chain length of the precursor fatty acids, but only where the original fatty acids are themselves diagnostic can this be utilised for more specific identification (Regert *et al.* 1998; Copley *et al.* 2005a). For example, the high concentrations of oleic acid (*cis*- $C_{18:1 \Delta^9}$) present in olive oil will be altered via processes of degradation, and oleic acid is moreover a ubiquitous and abundant component of many plant oils and animal products, including beef and pork. Positive identification of olive oil cannot therefore be made based upon this criterion.

Other plant oils do, however, contain more distinctive and unique distributions of components. Ricinoleic acid (12-hydroxy $C_{18:1 \Delta^9}$) is diagnostic of castor oil, forming a 9,12-dihydroxy $C_{18:1}$ fatty acid upon hydration at the position of the double bond (Copley *et al.* 2005a; Fig. 11.3). Oils of the Brassica family (*e.g.* mustard, lettuce oils) are also distinctive in lipid composition, characterised by $C_{20:1 \Delta^{11}}$

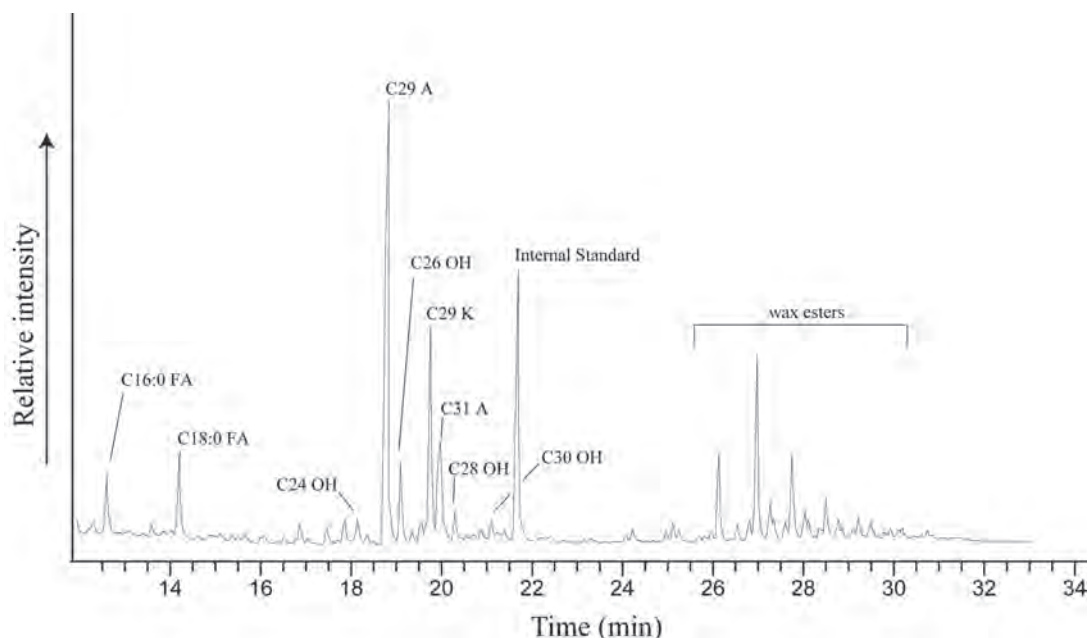


Figure 11.4. Partial gas chromatogram of trimethylsilylated Romano-British *mortarium* residue showing the presence of intact wax esters, *n*-alkanes, *n*-alkanols and mid-chain ketones, indicating degraded epicuticular plant wax. Abbreviations: CX:Y FA – free fatty acid with *X* carbon atoms and *Y* degree of unsaturation. CX A – *n*-alkane with *X* carbon atoms; CX OH – *n*-alkanol with *X* carbon atoms; CX K – mid-chain ketone with *X* carbon atoms.

$C_{22:1\Delta-13}$ and $C_{24:1\Delta-15}$ (Copley *et al.* 2005a; Colombini *et al.* 2005b). The presence of these components may likewise be inferred from hydroxylated products, *e.g.* 11,12-dihydroxyeicosanoic acid. Palm fruit oil has a distinctive fatty acid profile, characterised by high abundances of $C_{12:0}$ and $C_{14:0}$ fatty acids, and these distributions have been observed in post-Meroitic pottery sherds from Egyptian Nubia (Copley *et al.* 2001).

In addition to plant oils, biomarkers from plant epicuticular wax, which forms a waxy, waterproof layer over the plant cuticle, may be detectable in the lipid extracts from archaeological residues. These plant waxes are characterised by intact wax esters and a range of *n*-alkanes (usually, though not always dominated by the C_{29} or C_{31} homologues with an odd-over-even carbon number predominance), even carbon number long-chain free fatty acids (usually in the range C_{16} – C_{36} , frequently with no single major homologue), even carbon number *n*-alkanols (usually in the range C_{22} – C_{34} , occasionally with one or two homologues predominating) and odd carbon number mid-chain ketones (usually only one or two homologues, from C_{29} to C_{31} ; Kolattukudy *et al.* 1976; Tulloch 1976; Bianchi 1995). It should be noted that a distinctive range of mid-chain ketones may also arise via the condensation of saturated fatty acids heated in excess of 300° in a ceramic fabric, and therefore a wider range of ketones (*e.g.* C_{29} – C_{35}) would be expected to arise from animal fats under these

conditions (Evershed *et al.* 1995, Raven *et al.* 1997). Plant sterols (phytosterols) such as campesterol and β -sitosterol are relatively labile and only present in plants in relatively low concentrations, but would also be diagnostic of a plant contribution. Plant epicuticular waxes are readily distinguished from beeswax based upon distinctive distributions of palmitate and hydroxy wax esters in the latter as described in more detail below.

Degraded epicuticular waxes have been widely detected in absorbed residues from archaeological pottery, readily identifiable by a characteristic distribution of the components described above (Fig. 11.4). However, finding biomarkers that are diagnostic of a particular genus or even family is complicated by the fact that many of these components are ubiquitous in surface waxes, in addition to likely mixing of plant materials of different origins. In Classical antiquity, the range of plant commodities that may have been available is quite extensive, to include lettuce, broad beans, cabbage, fruits such as cherry, apple and grape, and herbs including dill, coriander and fennel (Alcock 2001; Bakels and Jacomet 2003). Traces of vegetable products in domestic pottery are consequently widespread in vessels of Classical origin, although more specific identification is not usually possible (*e.g.* Cramp *et al.* 2011; Kimpe *et al.* 2004; Ribechini *et al.* 2008a). However, some plants, including those of the *Brassica* genus, exhibit unique distributions of components that permit identification of processing of

more specific vegetable types in ancient pottery (Evershed *et al.* 1991).

Beeswax

Beeswax is a natural substance that occurs widely in antiquity (Crane 1999), both having been used in its own right, *e.g.* for waterproofing, or as a by-product of honey exploitation. Fresh beeswax is comprised of hydrocarbons (C_{25} – C_{29} *n*-alkanes and C_{31} – C_{33} alkenes), free fatty acids (C_{24} – C_{34}) and palmitate mono-, di- and hydroxyesters with alcohols of chain length C_{24} – C_{34} (Streibl *et al.* 1966; Tulloch 1970, Charters *et al.* 1995; Regert *et al.* 2001). The major hydrocarbon and fatty acid components are *n*-heptacosane and tetracosanoic acid, respectively, whilst C_{46} monoesters comprise the major wax ester component. Degradation experiments investigating post-depositional chemical alteration of beeswax have demonstrated that the distribution of esters remains relatively stable, despite the formation of C_{160} fatty acids and a range of even carbon number alcohols from the partial hydrolysis of the long-chain palmitate esters (Heron *et al.* 1994; Regert *et al.* 2001). However, degradation experiments performed at 60–100°C show the loss of *n*-alkanes with preferential loss of the shorter-chain homologues, via sublimation, within two days to six months (Regert *et al.* 2001). This has implications for the potential diagenetic alteration of the distribution of *n*-alkanes in beeswax at lower temperatures over archaeological timescales. Nonetheless, the distinctive lipid profile of beeswax has been identified in culinary contexts, notably in late Roman and late Saxon/early Medieval cooking pots (Kimpe *et al.* 2002; Charters *et al.* 1995). Furthermore, use of beeswax has also been observed in non-kitchen contexts, including as an illuminant in Minoan lamps (Evershed *et al.* 1997a) and as a common constituent of Egyptian mummy balms (Buckley and Evershed 2001; Buckley *et al.* 2004), particularly in Ptolemaic Egypt.

Resins and gums

Amongst various possible uses, resins and gums may have been exploited as waterproofing agents, as adhesives and as aromatic and antiseptic components of cosmetic or medicinal balms. Resins can be classified into two categories: true resins and “gum” resins, the latter of which contain both terpenoid and water-soluble gum components. Major families of interest are found within the conifers: Pinaceae (pine, cedar, fir) and Cupressaceae (juniper, cypress). Archaeological Pinaceae resins are characterised by a range of diterpenoids (biomolecules based on 4 isoprene units) based upon the abietane and pimarane skeletons, which include pimaric acid, abietic acid, and their oxidation products (Zavarin and Snajberk

1980; Evershed *et al.* 1985; Simoneit 1986; Serpico 2000; Stacey *et al.* 2006; Otto *et al.* 2007; Reber and Hart 2008; Fig. 11.5). Defunctionalised diterpenoid derivatives, such as retene and methyl retene, are formed through the process of intense heating and therefore the detection of these biomarkers can be construed as evidence for pitch (Evershed *et al.* 1985; Robinson *et al.* 1987; Connan and Nissenbaum 2003). Ancient resins that were produced by species of the Cupressaceae family are distinguishable from Pinaceae resins, being characterised by sandaracopimaric acid and polymers formed from communic acids (Mills and White 1994).

Resins of *Pistacia* sp. (*e.g.* mastic, only produced on the island of Chios, terebinth from the Near East, and various other species from the Mediterranean and North Africa) can be distinguished readily by the identification of triterpenoid components (based on 6 isoprene units) such as moronic, masticadienonic and isomasticadienonic acids, which usually accompany more common triterpenoids, including β -amyrin and oleanonic acid (*e.g.* Stern *et al.* 2003; 2008; Modugno *et al.* 2006a). Evidence for transport and trade of *Pistacia* resin for use as incense has been identified from resins adhering to Bronze Age bowls and Canaanite amphorae from Armana (Serpico and White 2000b), whilst mastic and cheaper “black mastic” (likely non-Chian terebinth; Dalby 2003, 209) is known to have been popular in the Mediterranean throughout Classical antiquity, amongst other things for medicine and hygiene (Howes 1950; Dalby 2003, 209). Various gum and balsamic resins may also have been available in the Roman period, including frankincense (*Boswellia* sp.) and myrrh (*Commiphora* sp.). These are aromatic triterpenoid gum resins native to Arabia and parts of Africa (Ethiopia, Somalia). Frankincense, although rarely recovered, is characterised by high concentrations of α - and β -boswellic acid, 11-keto- β -boswellic acid and lupeolic acid (Evershed *et al.* 1997b; Büchele *et al.* 2003). Myrrh, which is composed of a series of undiagnostic triterpenoid acids, also contains commic acids (Thomas and Willhalm 1964; Serpico 2000). Balsamic, or “aromatic” resins, so-called due to a chemical composition which includes predominantly esters of aromatic acids including cinnamic and benzoic acids (Mills and White 1994), include styrax (benzoin) from *Styrax officinalis* and storax from *Liquidambar orientalis*, which were produced in the eastern Mediterranean and Western Turkey/Rhodes, respectively. Although they are comprised of the same major components, such as cinnamic acid and benzoic acid, recent investigations into the composition of modern styrax and storax have identified means of differentiating these resins based upon some aromatic and triterpenoid components present in lower abundance (Modugno *et al.* 2006b).

True gums are comprised of polysaccharide components and as such usually have a greater propensity towards

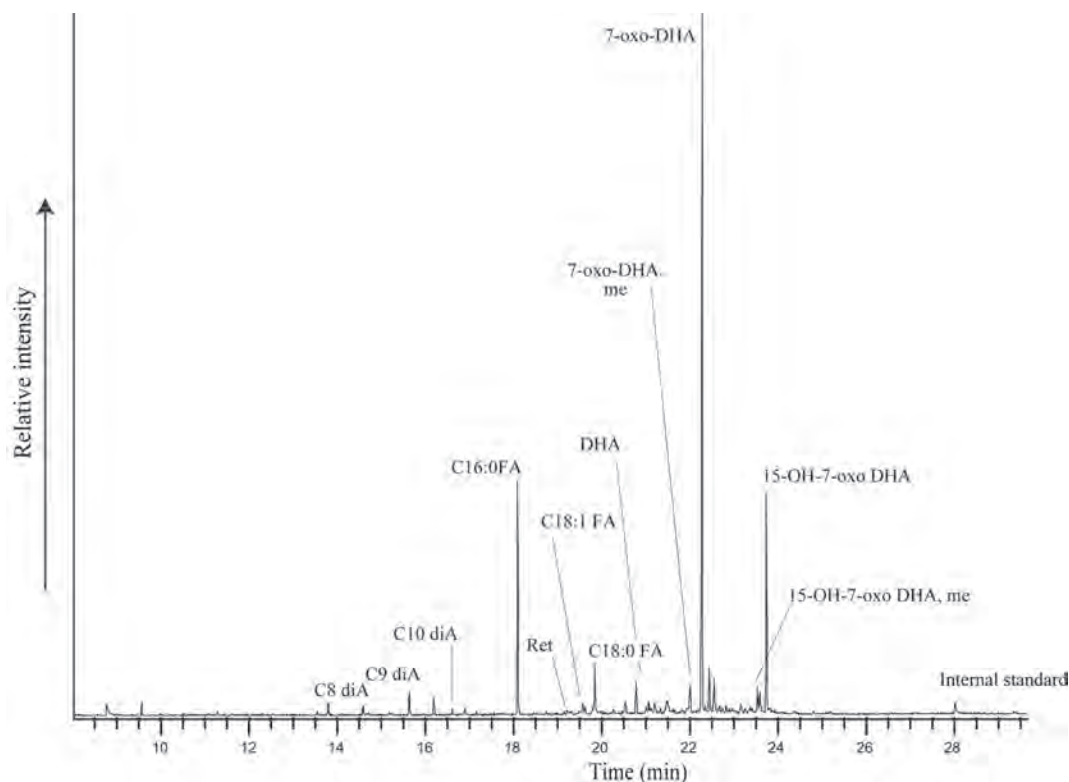


Figure 11.5. Gas chromatogram from a trimethylsilylated Romano-Egyptian mummy balm showing the distribution of diterpenoid components typical for a degraded coniferous resin. DHA – dehydroabiatic acid; 7-oxo-DHA – 7-oxo-dehydroabiatic acid; 7-oxo-DHA, me – 7-oxo-dehydroabiatic acid, methyl ester; 15-OH-7-oxo DHA – 15-hydroxy-7-oxo-dehydroabiatic acid; 15-OH-7-oxo DHA, me – 15-hydroxy-7-oxo-dehydroabiatic acid, methyl ester.

dissolution in water. Their survival may consequently be rare in less-than-arid conditions. Gums have been investigated from Macedonian and Mycenaean paint samples from Greece and Italy (Bonaduce *et al.* 2007), where simple sugar components have been analysed using GC or HPLC. Since most gums are comprised of a limited number of monosaccharides, it may not always be easy to distinguish gums of different origins; however, some key gums contain distinct proportions of different sugars, such as those from acacia and gum tragacanth (Newman and Serpico 2000). Py-GC/MS may also be used to investigate the composition of intact gums and as such may be more informative as to the structural composition of the polysaccharides, as has been applied to adhesives from ancient Egyptian cartonnages (Wright and Wheals 1987).

Wine and beer

Wine was a commodity of considerable social and economic importance in Classical antiquity and thus one that has attracted considerable efforts to directly identify it in the archaeological record. Tartaric acid

(2,3-dihydroxybutanedioic acid) and its salts are considered biomarkers for grape juice products (usually extrapolated as wine), since it accumulates in grape fruit and leaves, reaching relatively high concentrations (~ 5–8 mg ml⁻¹; Soyer *et al.* 2003). However, it is not exclusive to grapes and can be found in a range of other plants in low to very high concentrations, notably hawthorn fruits, where the concentration of tartaric acid is approximately 16 mg ml⁻¹ (McGovern *et al.* 2004). Furthermore, tartaric acid is not diagnostic of any processes of fermentation and hence could represent any product of these fruit juices, including vinegars or syrups. Tartaric acid is highly soluble in water (1.33 g/1 ml at RT; less so its salts) and therefore, unless preserved under the most arid conditions, this biomarker is susceptible not only to leaching from the original substrate, but movement within the burial environment.

Anthocyanins are responsible for the red to blue coloration in fruits, vegetables and flowers, including aubergines, red cabbage, red grapes and blackcurrants, with malvidin the major anthocyanin responsible for the coloration in red grapes (Coulter 2002). Although malvidin tends to polymerise with age, treatment with strong alkali

releases syringic acid (3,5-dimethoxy-4-hydroxybenzoic acid), a component which has been employed as a biomarker for coloration (e.g. red) of wine (Guasch-Jané *et al.* 2004; 2006). Free syringic acid, however, is not unique to grapes: a more recent study identified it in *Pistacia* leaves and fruit (Stern *et al.* 2008) whilst it is also known to be present in cereals and soil environments (Sosulski *et al.* 1982; Kim *et al.* 2005; Mukherjee *et al.* 2006). Without the prior separation of any free syringic acid present in the sample prior to the alkaline hydrolysis of malvidin polymers to release syringic acid, this component lacks the required specificity to be a biomarker for malvidin (Barnard *et al.* 2011) and, further, the absence of this component in a residue cannot reliably be interpreted as evidence for white grapes, although this has been asserted for residues from vessels in Tutankhamun's tomb (Guasch-Jané *et al.* 2006).

Many, and in particular, earlier identifications of wine employed Feigl "spot tests", a chemical technique by which the reaction of any tartaric acid with added chemicals would result in the product fluorescing under ultraviolet (UV) light, a method that has been used for "testing" for the presence of wine biomarkers (e.g. McGovern *et al.* 1996). However, aside from relatively low sensitivity (Feigl *et al.* 1966; Stern *et al.* 2008), there is also the risk of cross-reaction with other, undiagnostic compounds, such as malic acid (Boulton and Heron 2000). Infrared (IR) and Fourier Transform IR (FT-IR) spectroscopy have also been employed, but the infrared absorption bands do not unambiguously identify the presence of tartaric acid and, moreover, overlapping peaks resulting from the presence of other substances (e.g. resin) can also undermine its efficacy (Stern *et al.* 2008). Most reliable identifications of tartaric acid can be made by the combination of a chromatographic technique with mass spectrometry in order to confirm the peak identity based on its chemical structure. HPLC/MS and tandem LC-MS/MS are currently the most favoured analytical techniques in terms of separation, sensitivity and selectivity (Boulton and Heron 2000; Guasch-Jané *et al.* 2004; Stern *et al.* 2008), although concerns have been expressed regarding the poor retention of such polar compounds as tartaric and syringic acid on reverse phase columns, which may hinder robust interpretation of results (Barnard *et al.* 2011, 983). Claims for the positive identification of these biomarkers therefore should be scrutinised for the analytical methodologies involved; yet ultimately, although the analytical techniques are becoming better-refined and more reliable, the issue at stake is whether tartaric acid can confidently be considered a unique and non-migratory biomarker for grape-derived products, particularly where burial and preservation conditions are less than ideal, and whether in the absence of evidence for fermentation biomarkers it can really be interpreted as "wine".

Reliable evidence for brewing of beer in domestic

ceramic vessels is sparse. Calcium oxalate, or "beerstone", the inorganic product forming a crust during brewing, has been proposed as an indicator for brewing and its presence in pottery has been asserted using Feigl spot tests (e.g. McGovern 2009). However, since the formation of calcium oxalate from oxalic acid occurs as an intracellular process in plants (Franceschi and Horner 1980) and may also be present in soils, it cannot be considered a reliable marker for beer in pottery. The fungal sterol ergosterol has also been identified as a component of yeast and hence proposed as a marker for fermentation in pottery residues using GC/MS (Isaksson *et al.* 2010). Again, since this very unstable compound may also be found in soils and mould, caution is required before interpreting its identification in pottery residues as a brewing or baking indicator.

Reading the residues in Classical antiquity

Ceramic, glass, metal and stone vessels can fulfil a wide range of uses, to include storage, preparation and transportation of culinary or non-culinary products, cooking and serving, cosmetic, symbolic and decorative possibilities. Often, the function of ancient vessels is inferred from typological features (size, shape *etc.*), using ethnographic or experimental evidence to guide interpretation. Additional evidence of use-wear and in-situ contents, such as preserved macroscopic plant or animal remains or cremation deposits, is also considered alongside these features. The combination of this approach with evidence from organic residues can enable such interpretations to be confirmed, disproved or further developed from the disclosure of actual contents of during use. Thus far, investigations of vessel function from the Roman period have been generally based upon relatively small sample sets. However, the investigation of approximately 50 vessels of five different forms from Late Roman Sagalassos has indicated qualitative and quantitative differences between the residues from each category (jars, cooking pots, amphorae, *dolia* and *unguentaria*) that reaffirms differences in usage (Kimppe *et al.* 2004). Jars and cooking pots contained higher concentrations of saturated fatty acids in distributions indicative of animal products, whilst high concentrations of monounsaturated fatty acids, dicarboxylic acids and dihydroxy acids detected in *unguentaria* and amphorae suggest that these vessels were more frequently in contact with plant-derived oils.

The association of specific commodities with different vessel forms can be developed to elucidate culinary practices which can potentially be related to the cultural context of their users. For example, recent research into the residues of over 350 Roman *mortaria* has demonstrated

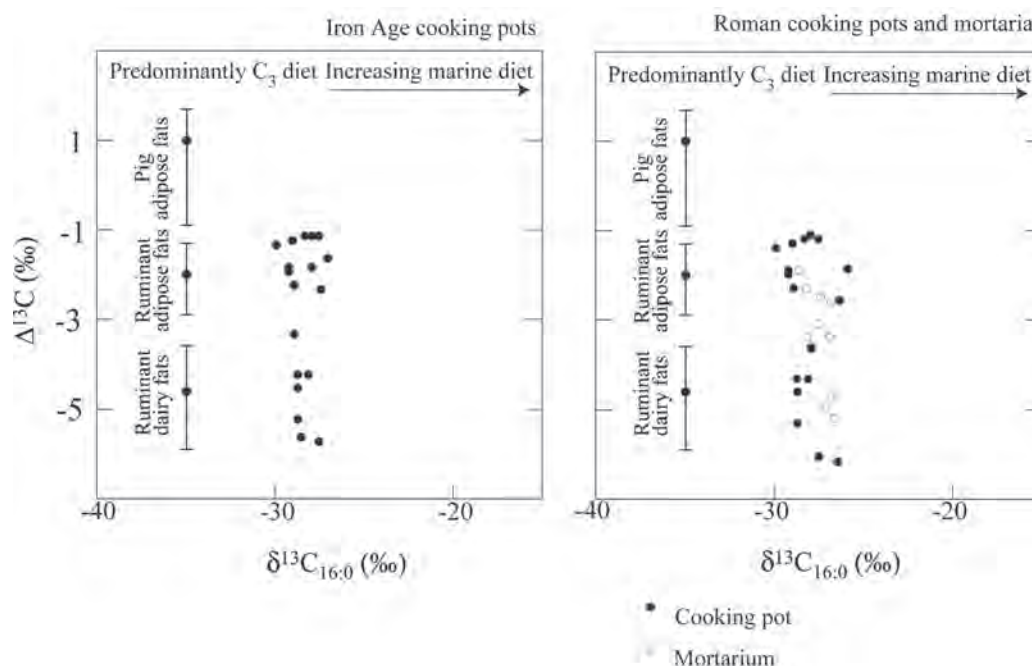


Figure 11.6. Scatter plots showing $\delta^{13}\text{C}$ values of individual fatty acids ($\text{C}_{16:0}$ plotted against $\Delta^{13}\text{C}$ [$\delta^{13}\text{C}_{18:0} - \delta^{13}\text{C}_{16:0}$]) from Iron Age and Roman pot residues from Stanwick, Northamptonshire. Ranges shown along the y axis are from modern reference tissues and are from Copley *et al.* 2003. Data from Iron Age cooking pots are from Copley *et al.* 2005b and those from the Roman cooking pots and *mortaria* are from Cramp *et al.* (2011).

that this vessel type was used intensively in Britain for processing waxy plant products, such as leaves, herbs or fruits (Cramp *et al.* 2011). The use of a specific vessel for plant processing is not identifiable in residues from British Iron Age pottery (Copley *et al.* 2005b), indicating that the introduction of this vessel into Late Iron Age and Roman Britain was accompanied by changes in food processing techniques, although this does not necessarily entail a change in the products exploited. Differences noted between other commodities mixed with the plant products at some more rural locations suggest, furthermore, that localised adaptations or patterns were also incorporated into the adoption of this vessel into Britain. For instance, the notably high prevalence of dairy products from Roman *mortaria* at the rural settlement of Stanwick in Northamptonshire reflects that identified in the Roman and Iron Age cooking pot residues from the same settlement (Cramp *et al.* 2012; Copley *et al.* 2005b; Fig. 11.6).

Residues in archaeological vessels may also have had a cosmetic or even pharmaceutical purpose, as demonstrated via the analysis of both the organic and inorganic components of a preserved Roman cream, recovered in a metal canister from a temple precinct in London. Investigation of the composition of this substance using FTIR, X-ray fluorescence, py-GC/MS and GC-C-IRMS revealed a mixture of starch and stannic oxide with

ruminant adipose fat, the latter probably comprising the base of this cosmetic (Evershed *et al.* 2004). Reconstruction of this mixture produced a product that could be applied to and absorbed easily into the skin, leaving a powdery and paler finish. Other investigations of in-situ residues recovered from Roman and Etruscan glass and alabaster unguentaria using FTIR, GC/MS and direct exposure (DE) MS have revealed the organic composition of contents, shown to include mixtures of beeswax, resins, traces of plant waxes and vegetable oils (Ribechini *et al.* 2008a; 2008b; Colombini *et al.* 2009). The presence of plant waxes, determined from characteristic distributions of long-chain saturated fatty acids, *n*-alkanes, *n*-alkanols, wax esters and phytosterols, may reflect the use of lipid-based products to extract fragrance from flowers or other natural products to produce a scented balm (Ribechini *et al.* 2008a).

Analysis of organic materials that comprised a deliberate part of vessel manufacture may also prove enlightening as to vessel function and contents and the technologies employed to optimise the vessel characteristics. Waterproof linings have long been recognised macroscopically as having been applied to the inner surfaces of amphorae in order to reduce the loss of contents through the porous fabric of the clay. Chemical analysis of these linings has revealed that pine pitch was utilised as a hydrophobic coating through the identification of a range of diterpenoids described

above (Heron and Pollard 1988; Beck *et al.* 1989; Colombini *et al.* 2005a). Until recently, it was deemed likely that resinous coatings were predominantly used for wine amphorae (see Heron and Pollard 1988). However, recent investigations have demonstrated traces of Pinaceae resin in Dressel 20 amphorae, a form usually associated with olive oil (Redford 2004) and in amphorae fragments from Sagalassos, mixed with biomarkers for plant-derived oils (Romanus *et al.* 2009). The latter study has also demonstrated through modern experimental work that a pitch coating does not preclude the absorption of wine polyphenols into the ceramic matrix, whilst it is relatively effective for the prevention of oil absorption. These data would therefore suggest that a resinous lining for olive oil amphorae would, in fact, have been a prudent measure to reduce product wastage, given that the experimental oil was shown to be highly permeable in uncoated pottery.

Historical records and, of course, preserved faunal and botanical records have provided a wealth of insight into diet in different regions and at different periods of time in the Roman Empire. In some respects, the information gleaned from these sources can provide more highly specific information as compared with residues remaining in the pottery. However, with the right questions being asked, the residues may be highly informative, especially as regards “hidden foods” that are difficult to detect otherwise in the archaeological record. Leafy plants, for example, were likely widespread in the Roman diet, and yet their identification in botanical remains is sparse, due to the fragile and flimsy nature of these plant parts. Whilst cereals, nuts and seeds are dense and conducive to preservation by carbonisation (enhanced by likely contact of cereals with heat during processing and disposal of debris on hearths), any leaves or stems that made it into contact with fire would likely burn to completion, leaving no trace. Waterlogged deposits provide greater hope for preservation, but fewer such deposits tend to be associated with culinary processing. However, waxes from vegetable material have been widely recovered in organic residues from the Roman era. Plant wax biomarkers have been detected in both Roman cooking and food preparation vessels (Cramp *et al.* 2011) and in non-culinary contexts, for example, the unguentaria described above. Therefore, evidence preserved in organic residues can offer evidence that is highly complementary to other sources of palaeodietary or palaeoenvironmental lines of evidence.

Whilst faunal remains provide detailed information regarding species exploited in the past, the investigation of organic residues may also directly elucidate the exploitation of another important “hidden” dietary component: dairy products, otherwise only indirectly inferred via the interpretation of dairying-related artefacts, and through mortality profiles of ruminant remains (*e.g.*

Payne 1973). The determination of the isotopic composition of preserved fatty acids allows dairy fats to be distinguished in archaeological residues and thus the prevalence of secondary products in ancient cooking vessels to be assessed. Interesting patterns of dairy product exploitation in the Roman world are emerging, namely the higher prevalence of these products in pottery from rural sites in Roman Britain, at a level consistent with the preceding Iron Age population (Cramp *et al.* 2012; Copley *et al.* 2005b). These findings lend some support to the idea of a stronger preference for dairy products by native Britons, as observed by Caesar (Book 5.14).

Concluding points

One of the earliest investigations of absorbed organic residues in archaeological was an attempt to unambiguously identify the contents of Roman amphorae (Condamin *et al.* 1976). Several decades on, analytical techniques and work on reference materials have progressed and expanded significantly; however, olive oil and wine, products that could be described as the essence of Classical antiquity, are still amongst the more difficult commodities to identify convincingly in ancient residues. It must be recognised that the investigation of lipids from this period is challenging, not least due to the wide range of possible commodities that are known to have been available, and this should influence the formation of research questions that this approach is used to address. Nonetheless, preserved ancient lipids possess great potential to elucidate aspects of diet, culture, trade and technology, providing complementary or unique evidence that can be used to enhance our understanding of this chronologically, geographically and culturally diverse period.

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COOKING POTS IN ANCIENT AND LATE ANTIQUE COOKBOOKS

Andrew James Donnelly

Introduction

The relatively recent scholarly focus on coarse wares has led to an increased discussion of quotidian activity and the relationship of pots to the people that produced and used them.¹ The specific function of cooking pots demands further study, as ascertaining how these vessels were used and what they cooked is of great importance for enhancing our knowledge of the culture of their creators and consumers (Lévi-Strauss 1969; Goody 1982; Garnsey 1999). Determining this function has been problematic for several reasons, which in turn has made discussing cooking pots in context difficult. Texts that discuss cooking are invaluable resources for determining vessel function and interpreting the archaeological record, provided the specific works are contextualised within the culture that produced them.² My goal in this paper is to discuss the ways that these cooking texts can be used to interpret the function of cooking pots and to evaluate the importance of this interpretation for assessing cultural variation.

The work of Paul Arthur is of particular importance to this topic and invaluable for my own work, especially his article “Pots and Boundaries” (2007a). Arthur argues that cookware can offer evidence of “cultural boundaries”, or zones defined by preferred dining patterns. His argument

relies on a binary model contrasting open-form casseroles with closed-form *ollae* and their relationship with recovered faunal evidence. Arthur describes a southern Italian diet marked by open forms and the consumption of sheep and goat, which was replaced in certain parts of the peninsula by a more northern European reliance on the *olla* – a word synonymous with “stewpot” – and a preference for pork. The model represents an important step in the interpretation of cookware and its relationship to culture. But a binary account of open and closed forms does not consider all of the variations and functions of cooking wares, and thus this discussion of the differences in function is incomplete.

There is a two-fold problem when discussing vessel function. The first is that it can be entirely too easy to make assumptions about a cooking pot’s function based on its appearance relative to cooking vessels currently in use (Allison 1999, 59–60). The second is that when definitions of use are created for a certain type of vessel, often with the assistance of a literary source, they are applied universally and without consideration of the vessel’s potential variation of function across time and geographic space. These tempting traps must be avoided. Simply put, the definition of a word is not static, and not all people used a vessel or even a word for a vessel the same way across the centuries.

A specific type of source, the cookbook, is an excellent place to begin an investigation of function. Cookbooks, unlike other textual sources, discuss vessels in their primary context of use.³ For this study I have looked at cooking texts by three authors: Apicius, Vinidarius and Anthimus. I focus on the recipes in each text that mention specific words for vessels in order to discuss the function of the vessels, as well as their importance to the cultures that produced these texts. This includes what was cooked in the vessel, where the food was prepared (*e.g.* in a stove) and the verbs used to describe the cooking process (Tables 12.1–12.3).

Apicius

Specific information about the identity of the first of our authors is largely unknown (Lindsay 1997). References to Apicius appear as early as the 1st century AD in Pliny the Elder's *Historia Naturalis* (Plin. *HN* 9.30). By the following century, however, the name Apicius was used to refer to anyone who fancied themselves a gourmet. Later Christian writers, unaware of this development, heaped scorn upon the quasi-historical Apicius, which indicates the low status that such authors accorded to gourmets and feasts and the increased importance of an abstemious life (Tert. *De anim.* 33; Grimm 1996). The man behind the cookbook has therefore been lost. What remains is a collection of recipes that seems to have been cobbled together from a variety of sources and ranges in date from the 1st century BC to the 3rd or 4th century AD.

Like the other cookbooks surveyed here, Apicius is a product of a specific culture. I have labeled Apicius “Greco-Roman”, and believe the text comes close to representing a diet that endured for some time under the Empire. This assessment is to an extent a necessary fiction, for Apicius does not stand for the entirety of diet in the Greek- and Latin-speaking world. Yet this cookbook nevertheless was a product of a Mediterranean supported by a sophisticated economy and the wide-scale movement and availability of food.

The cookbook is divided into ten chapters, each titled according to the food to be cooked, though these categories are not exclusive and there is overlap across chapters. There are over 450 recipes in Apicius.⁴ The work is often thought of as high-status and indeed, many of the meals, such as ostrich in sauce (6.2.21), seem rather exotic. The large number of spices listed in many of the recipes confirms that only the very wealthy could cook such meals. But other recipes are surprisingly simple, calling for ingredients that would have been easy to obtain (*e.g.* 4.2.2), which indicates that they could have been prepared by a significant portion of the populace.

Table 12.1. Vessel words and verbs in Apicius.

Vessel word	Verb	Count
<i>caccabus</i>		66
	<i>ferveo</i>	35
	<i>coquo</i>	14
	<i>bullio</i>	3
	<i>asso</i>	1
	<i>caleo</i>	1
	<i>elixo</i>	1
	<i>tepesco</i>	1
<i>patina</i>		30
	<i>ferveo</i>	17
	<i>coquo</i>	9
<i>patella</i>		18
	<i>coquo</i>	6
	<i>frigo</i>	2
	<i>bullio</i>	1
	<i>calefacio</i>	1
	<i>ferveo</i>	1
	<i>percoquo</i>	1
<i>olla</i>		7
	<i>bullio</i>	3
	<i>ferveo</i>	2
	<i>coquo</i>	1
	<i>elixo</i>	1
<i>clibanus</i>		4
	<i>coquo</i>	3
	<i>asso</i>	1
<i>pultarius</i>		3
	<i>bullio</i>	1
	<i>calefacio</i>	1
	<i>ferveo</i>	1
<i>sartago</i>		2
	<i>coquo</i>	1
<i>zema</i>		2
	<i>bullio</i>	1
	<i>elixo</i>	1

Apicius mentions many vessels (Table 12.1). I focus only on the most important for the sake of space. The *olla*, “le récipient par excellence de la cuisine romaine depuis l’Age du Bronze” (Bats 1988, 65), and the word that represents one of the two main cooking vessel shapes in Arthur’s binary model, is not prominently mentioned, appearing in only seven recipes. It was never used to prepare stews or soups. Instead, the *olla* was used to boil meals, ranging from crane or duck (6.2.1) to stuffed pig stomach (7.7.1). It was large enough that certain foods, such as a stuffed chicken (6.8.10), were first placed in a basket and then lowered into the vessel. Whether or not the water was conserved to make broth is unknown, though in Apicius liquid-based meals are prepared in other vessels. The most common cooking verb to appear with the *olla* is *bullio* (to make bubble or boil), which is used three times, followed by *ferveo* (to simmer or boil), which appears twice. *Coquo*, a generic word for cooking, and *elixo* (to boil or seethe) are each used once. The function of the *olla* is identical to that of the *zema*, which is mentioned only twice in Apicius, once with *bullio* (8.6.6) and once with *elixo* (8.1.10). What differences existed between the two cannot be determined from the text. This overlap is not uncommon, and could reflect morphological variations in the cooking pots, which necessitated a specific name yet did not alter the cooking process.

The cooking vessel that appears the most frequently in Apicius is the *caccabus*, and it is referenced 66 times. The *caccabus* had several functions: it could be used as a service vessel (6.2.21), a dish for marinating (5.4.4), to prepare a meal known as *minutal*, a sort of stew (4.3.1), or to make liquid draughts or soups (4.4.2). However, it was used primarily to make sauces, which would be added to other vessels (e.g. 2.1.5).

The most common cooking word associated with the *caccabus* is *ferveo*. The verb is used 35 times with the *caccabus*, meaning the vessel was used primarily to heat liquids. This function is reinforced by the use of the verbs *bullio*, which appears three times, and *elixo*, which occurs once. Three other cooking words appear once: *caleo* (to make warm), *tepesco* (to grow warm) and, oddly, *asso* (to roast). Variations of *coquo* appear 14 times. In two recipes the *caccabus* was to be chilled, either by placing it in the snow (4.1.2) or in cold water (4.1.1), though the majority of the time it was heated. The *caccabus* does not appear to have been meant for the oven: Apicius only mentions heating it on a *lento igni*, or slow fire (e.g. 5.1.3) or *vaporem ignis*, a term whose meaning is contested (2.2.2; see Grocock and Grainger 2006, 93). The *caccabus* could also be of considerable size: one recipe (8.6.11) calls for a whole, boned kid to be cooked in one. The fact that it was used in the preparation of both roasts and liquid meals indicates that the *caccabus* could have a relatively wide mouth.

The vessel mentioned with the next greatest frequency is the *patina*, which appears 30 times. Like the *caccabus*, the *patina* had many roles in Apicius’ cookbook: in addition to being a cooking pot, it could be used as a mixing bowl (3.2.1) and a serving dish (3.1.2). Unlike the *caccabus*, however, the *patina* was not used to prepare a sauce that would be added to another vessel. In fact, when a sauce is discussed in a recipe with a *patina* it is often one that has been made in a separate vessel, usually a *caccabus*, and then added to a *patina* containing food and cooked together (e.g. 8.7.11, 8.8.13). This most commonly occurs with the verb *ferveo*, which appears 17 times in recipes containing the *patina*, usually when a sauce previously prepared in a *caccabus* was added to a *patina*. *Coquo*, the more generic verb, appears nine times. The *patina* could be placed in the *furnus*, or oven (10.1.4), or in a *termospodium* (4.2.4; Cubberly *et al.* 1988). In addition, ashes from the fire could cover the vessel both above and below, indicative that the *patina* could be covered with a lid (4.2.33).

Particularly important for determining the function of the *patina* is a series of 36 recipes that use the name of the vessel as the name of the meal, e.g. “*patina* of asparagus” or “*patina* of elderberries”. These meals required the addition of a substantial number of eggs. In one recipe eggs are specifically called for in order to make the meal a *patina* (4.2.35). The eggs were stirred into the mix, heated, and then allowed to set. The result was a thick dish with a quiche-like consistency. Given that the *patina* led to the creation of many eponymous recipes, it seems safe to assume that this was both a very popular meal and the one the vessel was used most often to cook.

There was some functional overlap between the *caccabus* and the *patina*, especially in that both were used in the preparation of sauce-rich meals. The main differences between the two seems to have been: 1. the *patina* also had a more specific function, the creation of the egg-based dish that bore its name; 2. the *caccabus* is referenced more often in the creation of soups and other liquid dishes; and 3. their shapes. The *patina*, given its role in producing omelette- or soufflé-like meals, was a more open form with a flatter base than the *caccabus*, which often made stews and soups. The frequency with which these vessels are mentioned in Apicius (the two appear in several dozen recipes, while the next-mentioned cooking vessel, the *patella*, appears in 18), indicates that meals cooked with the *caccabus* or *patina* were probably consumed regularly in the Greco-Roman household.

Apicius lists several uses for the *patella*, including: as a container to hold a cooking kid in the oven (8.6.11), which indicates it could be sizeable; as a vessel used for preparing a lasagna-like dish (4.2.14); and as a mixing bowl for a dessert which was then cooked separately in an oven (7.11.6). This seems quite similar to the *patina*. Indeed, in six

recipes the *patella* was used for preparing the meal known as the *patina*. However, the *patella* could also be used in the manner of a *caccabus*, as stated in recipe 8.6.11, where a meal was to be cooked *in caccabum vel patellam*. The *patella* could be placed in an oven (8.6.9) or over a fire (4.2.6). There is a different range of cooking words used with this vessel as compared to the *patina* or *caccabus*: *coquo* is used six times, *frigo* (to fry) twice, and *calefacio* (to make warm), *percoquo* (to cook through), *ferveo* and *bullio* are each used once. In addition, the *patella* is one of the few vessels that Apicius mentions which could be made of metal (e.g. 2.1.5). The *patella*, I believe, occupied in the kitchen a multi-purpose middle ground between the *caccabus* and the *patina*, had a variety of functions, and was perhaps a bit larger than a *patina* and less deep than a *caccabus*.

The *sartago* is only referenced twice. One recipe is for cooking *ofellae* (7.4.5), or meaty tidbits, and this recipe includes no cooking verb. The other (10.1.5), which uses *coquo*, is for a sauce to cook fish. The *sartago* is traditionally translated as “frying pan”, and frying is probably what occurred in both of these recipes. However, the infrequency of the appearance of the *sartago*, and the lack of any other vessel specifically used for frying, is striking.

This examination of Apicius shows that a great range of ceramic vessels appear in this text, that these vessels often had semi-standard functions, and that they were used in conjunction while cooking. Ceramic vessels were a variety of shapes, from the flat *patina* to the deep *olla*. A *caccabus* could potentially have a wide mouth, but need not have. Metal vessels appear very infrequently. In addition, Apicius provides information about cooking places and how one cooked with the vessel. Smoking was mentioned rarely, and usually only as a way to colour and flavour food (e.g. 8.8.7). The most common cooking place was the *furnus*, which appears 26 times in the text. Direct fire – *igni* or *lento igni* – appears 18 times. Cooking on a *graticula*, or grill, was mentioned only six times, as was the *termospodium*.

There are other vessels worth investigating despite their infrequent appearance. The *pultarius* is often thought to be a type of porridge-pot (Vehling 1977, 85). It is used for this purpose in Apicius, but only once (3.15.2, a “vegetable mash”). But in two other recipes it is used to make a sauce, one for birds (where it is paired with the verb *calefacio*) and one for sea-urchins (which uses both *ferveo* and *bullio*) (6.2.15 and 9.8.1). In these instances the *pultarius* seems to duplicate the function of the *caccabus*. The reason a *pultarius* was called for in these latter two cases is unknown, though it is apparent that the *pultarius* was not exclusively limited to cooking porridge.

The *clibanus* appears only four times in Apicius, and is used to cook a fowl’s neck (7.5.5, paired with *coquo*); testicles (7.8, with *asso*); a hollowed-out lamb or kid (8.6.6, again with *coquo*) and dormice (8.9, once again with *coquo*). The

presence of the *clibanus* is noteworthy for two reasons: first, it appears extremely rarely in the text (compare with, by contrast, 26 mentions of the word *furnus*); and secondly, the *clibanus* is never used to bake bread (Cubberley 1995).

The most important observation for this study is that Apicius can inform us about the function of ceramic vessels present in archaeological contexts. These vessels had primary purposes in the Roman kitchen but also filled other roles. The *caccabus* could be used in many ways, but primarily made sauces. The *patina* primarily cooked food that a sauce was later added to. Sauces were a staple in Apicius’ recipes.

For the archaeologist interested in classifying material at a site, this does not mean one can point to a specific vessel and label it a *caccabus* (Berlin 1997, 3). Rather, Apicius and other cookbooks help scholars to interpret patterns in the archaeological record. An assemblage of cookware containing, for example, both flat-bottomed vessels and small, closed forms probably could have been used to prepare *patina* meals. The absence of such a combination, at least at a moderately wealthy site, may indicate that these meals were not prepared, and perhaps provides information on the *Romanitas* of a site’s inhabitants.

This examination of Apicius challenges Arthur’s model in that his stated dichotomy between the function of open and closed forms is not apparent in the textual record, and thus should not be used on its own to chart cooking practice. Issues of nomenclature are still apparent: the *olla* in Apicius has a different definition from the meaning the word is given by modern scholarship. Apicius’ *olla* was not a stewpot. The *caccabus*, *patina* and *patella* all overlapped in function yet were not identical in appearance. The *caccabus* is traditionally seen as a vessel with a small mouth and wide body, thus making it more of a closed form than the *patina* or *patella*, which Apicius indicates were open vessels. Yet all, despite their difference in size and shape, possessed symbiotic functions, and could be used interchangeably in certain recipes. Thus the archaeologist working with material culture must keep in mind that the kitchen in Apicius’ era was not merely composed of open and closed forms, and the function of these forms was not absolute.

Vinidarius

As with Apicius, little is known of the author of the second cookbook. The text is an emendation to the manuscript of Apicius, and the name Vinidarius closely matches the Gothic name “Winitharius” which appears in Cassiodorus (Var. 11.1.9) and “Vinitharius” in Jordanes (Get. 79). That, along with his rank listed in the manuscript (a *vir inlustris*), and the relatively vulgar Latin of the text, indicate that Vinidarius was alive in either the 5th or 6th century AD.

Table 12.2. Vessel words and verbs in Vinidarius.

Vessel word	Verb	Count
<i>patina</i>		7
	<i>coquo</i>	6
	<i>ferveo</i>	1
<i>caccabus</i>		5
	<i>ferveo</i>	3
	<i>bullio</i>	2
	<i>frigo</i>	1
<i>sartago</i>		2
	<i>frigo</i>	2
<i>patella</i>		1

As Apicius is part of a “Greco-Roman” tradition, Vinidarius represents a “Romano-Gothic” one. Vinidarius contains only 31 recipes, and there are far fewer vessels mentioned in the work than in Apicius (Table 12.2). The *patina* appears the most frequently in Vinidarius, at seven times. The verb *coquo* is used six times in conjunction with the *patina*, and *ferveo* once (one recipe uses both verbs). On two occasions (14, 15) the vessel was used to cook a meal to which a sauce prepared in a *caccabus* was added. The only time a cooking place is mentioned with a *patina* is recipe 19, which calls for the *patina* to be placed over *ignem lentem*. In recipe 15 the *patina* is used interchangeably with the *patella* (in the latter’s only appearance in the text), mirroring the overlap of vocabulary present in Apicius.

The *caccabus* is the other prominent vessel, appearing five times. It is twice used as mentioned above and once to cook a lamb stew (27). *Ferveo* was used for the creation of the sauces, while *bullio* was used for the stew. In the other two occasions the vessel was used to fry fish (8) and to make a sauce for a piglet (24). In Vinidarius the *caccabus*, and not the *patina*, is the vessel after which a meal was named. Three recipes are for “*caccabina*”, a meal that strongly resembles the *patina* of Anthimus, including the addition of eggs. Surprisingly, the *caccabus* is not mentioned in the preparation of *caccabina*: rather, the one cooking pot discussed is a *patina* (2). In one case the *caccabina* (prepared in an un-named vessel) is cooked in *cinere calido* (1). The *sartago* is mentioned twice, the same number of occurrences as in Apicius. In both cases it is for the cooking of *ofellae* (3, 4), and the verb *frigo* is used on both occasions. This is similar to Apicius, though the definition is more specific in Vinidarius.

Vinidarius’ cookbook indicates that dining culture

Table 12.3. Vessel words and verbs in Anthimus.

Vessel word	Verb	Count
<i>olla</i>		2
	<i>coquo</i>	1
<i>gauata</i>		1
	<i>coquo</i>	1

among the Romano-Gothic people, perhaps those in Italy, was similar to the Greco-Roman tradition in Apicius mentioned above with a certain amount of continuity of tradition. There are enough differences, however, to hint at cultural variations. The most prominent is the lack of cooking places. Ovens are never mentioned, and the only two examples of where food was cooked in the text are listed above. There is also a simplification of vessel forms: there are 19 different words for cooking pots in Apicius, and only seven in Vinidarius. Certain traditions endured: sauces were still common, and vessels such as the *patina* and the *caccabus* were still used in a familiar manner. Interestingly, the *olla* is not mentioned in the Romano-Gothic Vinidarius text.

Anthimus

The final recipe book is *De observatione ciborum* by Anthimus. Anthimus, like the other authors, is a relatively unknown figure. He appears to have been a Greek physician who was involved in a conspiracy against the emperor Zeno, exiled to Italy and came to serve the Gothic king Theoderic. Anthimus was later, based on the introduction to his treatise, sent to the court of the Frankish king Theuderic, and *De observatione ciborum* is a letter written to Theuderic or the Ostrogothic king Theoderic regarding the dietary practice of the Frankish people.⁵

Writing in the 6th century, Anthimus examines “barbarian” or “Frankish” diet, though he does so as an outsider, and the text marks a clear break from the previous two cookbooks. Anthimus is close to being acerbic, as pottery is only mentioned in three of the 94 recipes (Table 12.3).

The first vessel mentioned is the *olla* (a word Anthimus uses interchangeably with *vas*), which was used to heat a significant quantity of watery sauce into which previously cooked meat was placed and allowed to soak (3). The only cooking word used is *coquo*, which is very vague, though Anthimus does instruct that the vessel be placed over a “*lento foco*”, or slow hearth, a term not seen in the other works but reminiscent of Apicius’ “*lento igni*”. In this

particular case, unlike Apicius, the *olla* was used as a sort of stewpot. In addition, in this recipe Anthimus suggests that one should make sure to use a ceramic pot because such a vessel prepares a better meal than a *buculari*, an unknown word which must refer to either a stone or metal vessel. The theme of earthenware's advantage appears in recipe 75, in which he suggests a ceramic vessel (an *olla*) is better than an *aeramine* for keeping fresh milk warm.

The only two other examples of vessels in the text are a *hapax legomenon* and a corruption. The *gauata*, meaning unknown, is referenced in recipe 34 as a cooking pot for preparing a meal Anthimus calls *afrutum* in Greek or *spumeum* in Latin. This is a dish of chicken and egg whites over gravy and fish sauce that was cooked (*coquo*) in the steam or smoke of burning coal. The *gauata* would then be placed in a serving dish, the *missoio* (which must be a corruption of *missorium*, a type of service vessel). Given the necessary shape of the *gauata* (to arrange the layers of food properly, it must have been relatively open), and that it had a flat bottom, this would seem to be a vessel similar to a deep *patina* or very open *caccabus*.

The most striking thing about the text is the absence of vessels. Indeed, Anthimus provides tantalising reminders that food was not always prepared in cooking pots. Several recipes call for food to be cooked in other manners. A pig's liver could be cut up, coated in oil or fat and cooked on metal rods over charcoal (21), and eels cooked via a skewer over fire (43). In fact, Anthimus notes that eels cooked this way were better for a person than if they were boiled. In other words, it was considered healthier in this case not to use a ceramic vessel. Also of note is the change in cooking locations. Ovens appear in Anthimus only once, in a recipe for suckling pig (10). The most common word in this text is *focus*, or hearth, which appears eight times, followed by *carbones*, or coals, which appears in seven recipes. The use of open flame to cook is not on its own surprising, and Apicius also had several recipes that called for meals to be cooked over heat or in coals. However, what stands out is the lack of other cooking options. The *furnus*, so common in Apicius, is a rarity in Anthimus.

This leads to another point: in Apicius, recipes that call for heat with fire do so by instructing that the vessel be placed above the flame. In Anthimus, food is placed "at a long distance" from the fire (e.g. 4), indicative that the food was not cooked above the flames, but rather alongside them. If a ceramic vessel were used this way it would blacken differently from one suspended over a fire.⁶ Where a vessel is blackened is thus a potential way to examine cooking and cultural dietary preference.

Anthimus suggests that ceramic vessels were less popular with the Franks than were metal or stone pots. His repetition that ceramic vessels were better than metal for cooking may be remonstrations against practices he

saw every day. This is indicative, perhaps, of a contrast in cooking practices the learned Byzantine observed between the land of his birth and his new home.

Conclusion

These three texts illustrate the differing methods of cooking by these cultural groups. The differences between Apicius and Vinidarius are rather subtle: there is a winnowing of vessel vocabulary, for example, and enough difference in cooking practice (e.g. the replacement of *patina* dishes with *caccabina*) to indicate that these changes occurred somewhat slowly. However, Anthimus marks a very significant break in cooking practice. The Franks often cooked without ceramics at all and appear to have preferred non-ceramic vessels. The meals in Anthimus feature very few sauces, and meats more often than not were cooked by direct exposure to fire. The oven was replaced with the open hearth. The scenario calls to mind Massimo Montanari's (1994, 5–15) observations about dietary change in Europe and the barbarian's replacement of Greco-Roman cooking practices with their emphasis on roasting.

This simplification of ceramics in the texts mirrors closely the pattern observed by Arthur (2007b) in the archaeological record. Just as the vocabulary for cooking and cooking pots became less complex, so too did the morphology of the pots themselves. It is here that the textual and archaeological data most closely overlap, and provide an excellent example of how these two disparate sources can be reconciled. The best way to integrate them is by looking for mutual patterns of change and consistency.

I conclude with several observations. The first has to do with social hierarchy: amongst the poor, who had less access to variety, I suspect that vessels became even more multi-purpose. The second is that a limited range or lack of cooking pots at a site need not indicate relative poverty or even a lack of variation in cooking practice. This may instead simply be a sign of preference by a people who preferred cooking with metal vessels, which often are not preserved, or favoured cooking by other means, such as cooking in embers, on a grate or roasting on a spit. Almost every meal in Apicius was prepared in a cooking pot, while very few meals were prepared in vessels in Anthimus. It may well be that ceramics themselves were a part of Greco-Roman food culture in a way that they never were for the barbarians. We need not fall into the trap of thinking that a lack of vessels indicates a lack of technological sophistication or economic power: it simply may indicate dietary preference. Third, cooking ware can absolutely be a useful tool for determining cultural boundaries and dietary preference. But a reliance on a model that pits closed and open forms against each other incompletely assesses the

role these vessels played in the kitchen. Determining vessel function is much more complex, and we have enough documentary data and material culture to help us carry out this study.

Notes

- 1 Among many, Vroom 2003 stands out.
- 2 Bats 1988, which relies on a variety of textual resources; Hilgers 1969 remains an invaluable reference.
- 3 Scott 1997 is an excellent example of this.
- 4 I use the numbering system from Grocock and Grainger 2006.
- 5 See Grant 1996, 9–44; an excellent re-examination of Anthimus' history is Hen 2006.
- 6 See the essays by Banducci, Fourrier, Lis and Morrison in this volume.

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UNCHANGING TASTES: FIRST STEPS TOWARDS THE CORRELATION OF THE EVIDENCE FOR FOOD PREPARATION AND CONSUMPTION IN ANCIENT LACONIA

Elizabeth Langridge-Noti

Naturally Spartans are the bravest men in the world. Anyone in his senses would rather die 10,000 times than take his share of such a sorry diet.

A Sybarite speaking: Athenaios 138d

Introduction

The connection of food preparation and consumption with cultural identity has always been particularly strong for Sparta and Laconia. Information from such chronologically diverse sources as Herodotus, Xenophon, Dikaiarchos, Athenaios and Plutarch (5th century BC to 2nd century AD) informs us that Laconian strength was perceived as visible partially through their extremely abstemious and often unique, within the Greek world, take on food preparation and consumption. Furthermore, sources suggest that food preparation and consumption were associated with status within Laconia, as well as with the perception of Laconia by the outside world. The view of Spartan food was most often through the lens of the Spartan mess, the *phidition/syssition*, that is, from the point of view of the elite Spartiate. Within this setting, however, we also glimpse a second component of the Spartan world – the helot – who is made to consume as Spartiates would not have (Plut. *Lyc.* 28.4; Plut. *Inst. Lac.* 239A). Spartan women and *perioikoi* (the “dwellers-around” and the third human component of the Spartan state) are, for the most part, invisible here.

Current excavations at the perioikic site at Geraki, ancient Geronthrai, now give the opportunity to evaluate and expand upon the information from the literary sources by adding two new ingredients to the analysis: floral and faunal analyses and the historical-period cooking equipment from the site. Finally, because of the site’s nature as a “perioikic” site, it may also be possible to catch a glimpse of the elusive third component of the ancient Spartan state, the *perioikoi*. The site itself sits in foothills at a crossroads on the routes from Sparta to modern Monemvasia and from Gytheion into the Parnon range and to modern Kosmas.

Thus, this paper consists of three components. In Part 1, I lay out the primary type of literary source material available for cooking and eating in Laconia, indicating its limitations. In Part 2, I present some of the preliminary results of the floral and faunal analyses at Geraki; the first set of these analyses comes from historical-period Laconia. I consider both convergences with and divergences from the literary sources, keeping in mind the limitations noted above. In Part 3, I turn to food preparation equipment and, occasionally, serving equipment. I place the types of cooking wares that appear at Geraki within their broad Greek context but also consider what may be viewed as specifically Laconian. Furthermore, I consider how these forms might relate to the types of foods mentioned in the literary sources and what they might suggest about

the preparation and serving of the foods noted in Part 2. I conclude by drawing these strands together to consider what paths might be pursued profitably to elucidate further Laconian cooking and eating patterns over time. I remain aware throughout that the archaeology and our literary sources do not always refer to the same components of Spartan society, nor even to the same time period, if one can be identified, so that the patterns seen remain hypothetical. However, I would suggest that the diachronic and social convergences suggested below may be worth considering as a starting point for future research on Spartan and Laconian food consumption.

1. Literary sources

The literary sources can, essentially, be broken down into two separate strands. The first tells us something about what and how the Spartans ate; the second tells us something about which foodstuffs were most closely associated with Laconia. In both cases, the evidence is fragmentary and often comes from snippets preserved in encyclopaedic authors such as Athenaios and Galen. Unusually for the Greek world, although perhaps not surprising if we consider that Laconia and Messenia contain some of the most fertile land in southern Greece, and in contrast with what many sources appear to suggest about the conservative and unchanging fare of the people that lived in Laconia, a number of foods are given a name that links them explicitly with Laconia. This suggests a diversity in what was thought to be available in Laconia: Laconian cucumbers/chate melons (Theophr. *Hist. Pl.* 7.4.6), Laconian figs (Ar., *The Farmers* [Kock 1.419] and Ath. 3.75d), Laconian lettuce (Theophr. *Hist. Pl.* 7.4.5 [Ath. 2.69a]) and Laconian apples (Ath. 3.82c and d], citing Androtion and Pamphilos). Laconian wine is referred to in Alcman (139 [Ath. 1.31c]) and in Theognis (879–884), who indicate at least six to seven vintages known from Laconia itself, although later Greek sources, such as Diphilus of Sinope (96 [Ath. *Epitome* 67d]), refer to Spartan wine as vinegar (Dalby 1996, 97 and 248 note 40).

Aside from the wine, only one of these foodstuffs, the fig, actually appears explicitly within the other major strand of ancient discussion on eating in Laconia – that revolving around the Spartan *syssitia* and thus, primarily, elite Spartiates. Spartiates were required to donate set amounts of barley, wine, cheese, figs and *opsonion* from their *kleros* for the *syssitia* (Plut. *Lyc.* 12.3 and Dicaearchus Fr. 23 [Ath. 4.141c], Pollux 6.57; modern discussions: Figueira 1984 and Hodkinson 2000, 218). The basic foods required for the *syssitia* must have been grown or produced locally and thus probably formed the foundation of the diet of most people living in Laconia, including the Spartiates. Since

these foods were not luxuries but rather staples, indeed staples for much of Greece, it is difficult to imagine that the *perioikoi* or helots were growing produce for themselves that was different from what was given to elite Spartiates for consumption. Thus, one of the distinctive features of Laconian diet may well have been the foregrounding of the elite consumption of staple foodstuffs (Hodkinson 2000, 356–358). These basic foodstuffs, however, were not the only foods that our sources say were consumed at the *syssitia*. There were additional “gifts”, *epaikla* or *mattyta*, which could be shared by members of the individual mess; products of the hunt or wheat bread are the most conspicuous examples in our sources (Xen. *Lac.* 5.2, Molpis *FHG* 2.623 [Ath. 4.140e], 4.453 [Ath. 4.141d–e] and Menippus [Ath. 14.664d]) and include various small birds – ring-doves, geese, turtle-doves, thrushes and blackbirds – as well as hares, lambs and kids (Dicaearchus, *Tri-Statesman* ii.242 [Ath. 4.141b] and Sphairos *FHG* 3.20 [Ath. 141c–d]). While exotic, imported goods might find their way into a mess in these dishes, the emphasis on the hunt suggests that effort, not wealth, was key (see Hodkinson 2000, 358). Finally, the encyclopaedic gatherings of authors such as Galen and Athenaios give us more information about the way in which foods were prepared. These include the “black broth” that formed a staple at the common messes and was presumably made from the pork that was part of the *opsonion* in the contributions to the *syssition* (Plut. *Lyc.* 12.6–7 and Dicaearchus, *Tri-Statesman* ii.242 [Ath. 4.141b] and Antiphanes, *The Magistrate* [Kock 2.28], Ar. *Eq.* 278–279) but also the various forms of grain preparation such as *kammata* and *maza*. Both of these were prepared with barley meal, but they appear to be differentiated in the way in which the barley was ground and whether it was or was not baked (Nikocles the Spartan *FHG* 4.464 [Ath. 4.140d]).¹ Braun (1995, 28–29) notes that the latter would have been particularly easy to prepare on campaign and, thus, particularly useful to the Spartiate. The existence of both *kammata* and *maza* indicates variety in the ways in which basic ingredients, such as barley, could be handled within Spartan cooking; something that can be seen most explicitly throughout Athenaios, although Dicaearchus, *Tri-Statesman* ii.242 [Ath. 4.141b] suggests that the basic foods were eaten plain.

This broadly drawn literary picture of Laconian foodstuffs contains some difficulties, the most prominent of which is the difficulty in fine-tuning the historical chronologies in order to permit a picture of a specific dish at a specific time period being eaten by a specific group of people. After all, we do not really know how much of the type of the food prepared for the *syssition* was consumed by Laconians other than full Spartiates, nor can we be completely certain if traditional forms of cooking would have survived the upheavals of the 4th and 3rd centuries

BC, which included the dissolution and the (brief) re-introduction of the *syssition* (Phylarchus *FGrH* 81F44/FHG 3.146 [Ath. 141f–142b]). Indeed, the Phylarchus passage suggests that in the 3rd century BC, elites in Sparta were feasting much as elites did elsewhere (Hodkinson 2000, 434–435). Still, it should be noted here that many of the foods listed above would have been the staple foods of most Greeks, not the luxury foods that form the focus of our sources in discussing elite diet in many parts of the Greek world. Indeed, the next two sections suggest that certain foods and ways of preparing foods may well have had a broad social life as well as an extended chronological one in Laconia.

2. Archaeologically attested foodstuffs

An examination of the floral and faunal material at Geraki itself may serve as a starting point for suggesting some possible eating habits of the Lacedaimonians at a single given point in time. Testing and analysis of the excavation materials are still in their preliminary stages, so the suggestions made and conclusions drawn in this paper may well change as further work is done both at Geraki and eventually, one hopes, at other historical-period Laconian sites as well.

The archaeological remains at the site of Geraki in Laconia span the centuries from the Neolithic to the late Hellenistic period (Crouwel *et al.* 1995–2008). For the historical period, however, the material found to date has revealed a site with highly fragmentary remains of the Archaic and Classical periods but with houses and deposits that span most of the Hellenistic period. Indeed, almost nothing on the site can be dated later than the 1st century BC, despite the fact that Pausanias (3.22.7) notes a functioning sanctuary of Apollo on the acropolis when he visits in the second century AD. It is the material from the Hellenistic contexts that will be the focus below.

Botanical remains are scarce to date on account of a lack of burnt destruction deposits and layers for the historical period. Despite this there are some preliminary statements that can be made. Unsurprisingly, both from a consideration of the literary sources as well as from floral studies elsewhere in Greece, both the grape (so presumably wine) and grain are represented in the surviving material. Figs also appear in the Hellenistic material remains. Barley and wheat are present – although it is still difficult to talk about comparative percentages for the two grains for the period at the site. Processed cereal may occur in one instance, so possibly one of the types of barley mash named above, *maza* or *kammata*, is present at the site. Both lentils and broad beans are also found on site and it can be tempting to suggest that they relate to the “black broth”

that the literary sources note as a Spartan peculiarity, although most of the recipes involving lentils in the ancient literary sources imply that they are prepared more along the lines of the cold bean salads that are seen today (Ath. 4.139a). They may also have been ground into a meal for some type of flat bread, such as the *plakous* mentioned in the literary sources (Antiphanes [Ath. 11.449c]). Almonds and walnuts round out the floral remains found to date and also appear in the lists that describe *epaikla* (Molpis *FHG* 4.453 [Ath. 4.140a–b]).

The faunal remains are more plentiful and, although study is also still in a preliminary stage, the remains indicate that Geraki fits into a general pattern of animal exploitation as seen in Greece with sheep and goat most prominent for meat as represented by bone weight, followed very closely by cattle. There is some evidence on the bones of both butchering and defleshing (Buitenhuis in Crouwel 2008, 21–28). At Geraki, pigs are clearly part of the standard domestic animal assemblage, as is indicated by the number of young pigs represented in the faunal remains, suggesting that they were deliberately culled and slaughtered for their meat.² Deer and hare are also represented, indicating that domesticated animals do not provide the only meat consumed on site. Finally, the visibility of birds, including chickens, at Geraki is unusual and not reflected at many other excavation sites in Greece, although whether this reflects particularly careful excavation practices at the site or actual site-specific eating habits is still uncertain. In fact, the breakdown of faunal remains becomes interesting if we consider it in the light of the components of a Spartan *syssition* as noted above. The physical evidence at Geraki (with the presence of pig, as well as of birds and other wild meats) is consistent with the literary picture painted of the foods traditionally eaten at the *syssition* – and suggests that, as noted above, future research needs to consider just how “special” a “Spartiate” diet was, certainly within the confines of Laconia, and what the dissolution of the *syssition* actually meant in terms of food preparation and consumption. The initial implication of these connections suggests that the “difference” in Spartiate diet might actually be related to their regular, foregrounded consumption of non-elite foods.

3. The pottery

Three things will be examined in this final section of the paper. Firstly, how does the Geraki cooking pottery assemblage compare very broadly to cooking pottery assemblages in Greece over the Hellenistic period and in Laconia over time? Secondly, taking into account that our literary sources stress distinctiveness in aspects of Laconian eating, are there unusual food preparation forms or vessels

that appear in quantity that might suggest distinctive food preparation within Laconia? Finally, can the Geraki assemblage begin to help us to map elements of the relationship between the various groups of people that lived in Laconia, Spartiate and *perioikic* in particular? As noted in the previous section, work on the material from Geraki is still in its initial stages and so the preliminary observations made below will continue to be enriched by further work.

In Geraki, cooking in the Hellenistic period is attested by a number of fixed features at the site, which to date include at least four separate buildings. These include burned areas, perhaps hearths, as well as small structures built with small slabs, one of which contained clear traces of burning in a fine, ashy interior. There are also the remains of three small clay ovens, as well as some cooking pits that contained floral material, such as figs, in the Hellenistic levels of the rooms that have been excavated to date. Interestingly, burnt areas do not always appear to correspond with where the most cooking pots were found and this, combined with a lack of braziers, suggests that food preparation vessels were often stored in places separate from where food preparation took place. This will be investigated further as work continues at the site.

Round-bottomed baggy cooking pots are one of the most common cooking pot forms at the site, as they are in much of the rest of the Greek world at most periods

(Fig. 13.1). Although there are differences in size and in the rendering of handle and lip, the basic form is baggy, often with a neck of some sort and a narrow mouth. These pots are potentially indicative of the stewed and boiled foods that often appear to be the basis of cooked foods in the ancient Greek world. As is true of all the identified cooking pots at the site, there are indications of blackening from use on a fire – most often on the bottom of the pot, but sometimes on the sides, lip and interior. Indeed, with a meat broth as one of the staple Spartiate foods for the Archaic and Classical periods, as noted above, this type of food preparation vessel would be expected within Laconia. It is also possible that the barley porridge that has been tentatively identified at the site could also be prepared within this type of pot. Finally, the one-handed cups that are ubiquitous in Laconia may have served in part as containers for the hot liquids that came from these pots, as we find them not just in fine fabrics but also in coarser fabrics that suggest other types of use distinct from the table wares that tend to be associated with wine drinking.

Also visible within the archaeological record at Geraki are the shallow rounded-bottom *lopas* (see below Fig. 13.3), the other main shape in the Greek kitchen assemblages. Preliminary inspection macroscopically and with a hand lens suggests that this form exists at the site in a variety of fabrics including that used for the baggy cooking pot



Figure 13.1. Overview of the excavated area at Geraki. © Dutch Excavations at Geraki in Laconia.

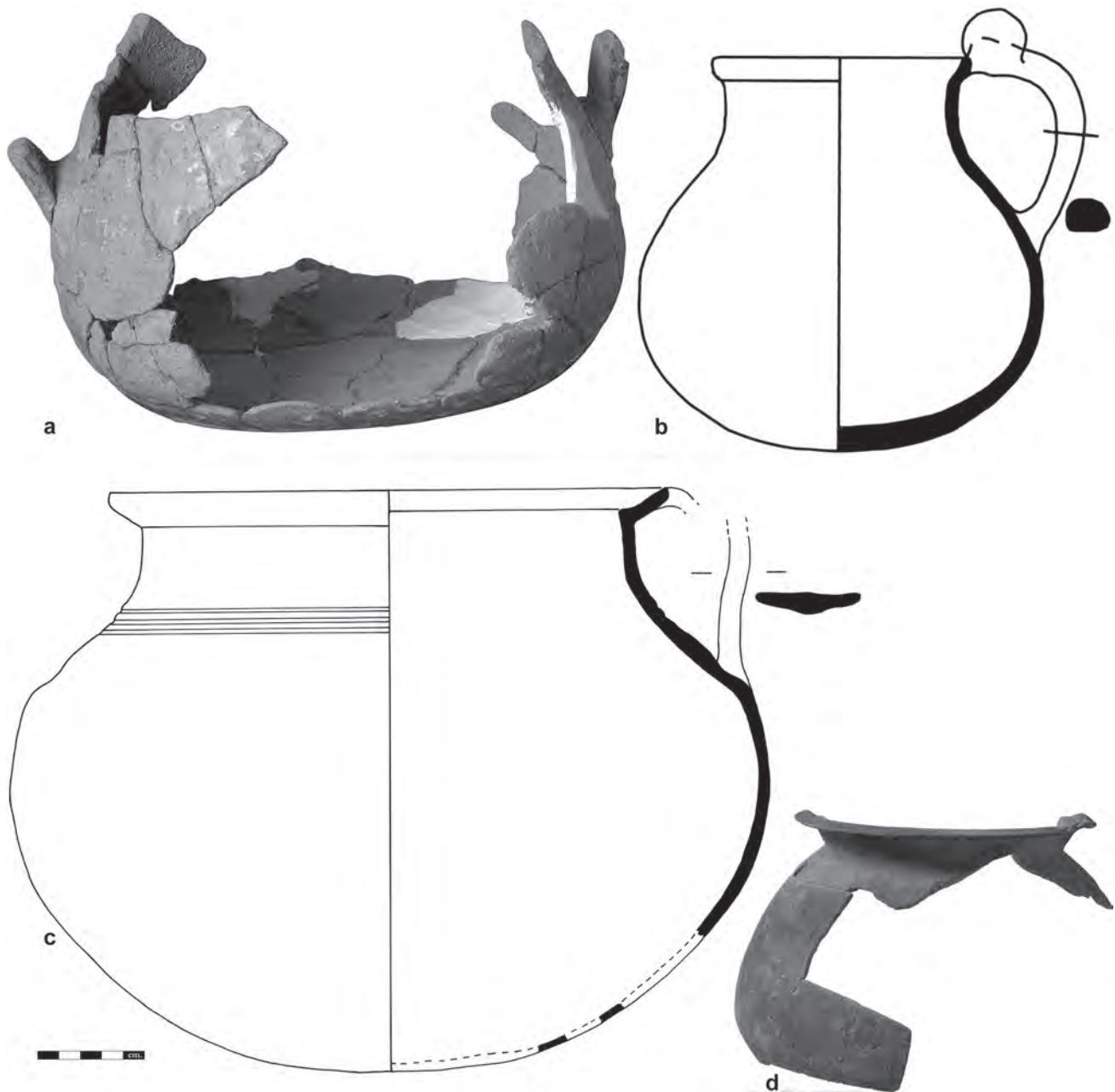


Figure 13.2. Baggy cooking pot. a) 359/SF6; b) 4512/SF3; c) 4603/SF1; d) 5272/SF4. © Dutch Excavations at Geraki in Laconia.

discussed above (Fig. 13.2). This form also appears in most cooking ware assemblages examined to date at Geraki. Handle forms here can differ from pot to pot, but the most common is a pinched form that hugs the body. The different handle forms could permit a variety of interpretations, including the possibility that different handles suggest different specific uses for the form (lifting vs. shaking).

A further cooking shape, and one that appears to be particular to Laconia, is the flat-bottomed pan (Fig. 13.4).

Its popularity in Laconia and its rarity elsewhere in the Greek world are suggestive of some local dish, and the tawny pink fabric of many, as inspected macroscopically with a hand lens, is a fabric also seen in the two forms above and may well be local (7.5YR 7/6 to 6/2 Munsell range with many small to large inclusions, including grog, black stone and quartz). The single handle, the large heavy form and the indication/marks of heavy burning on the bottom and sides suggest that this is a shape that

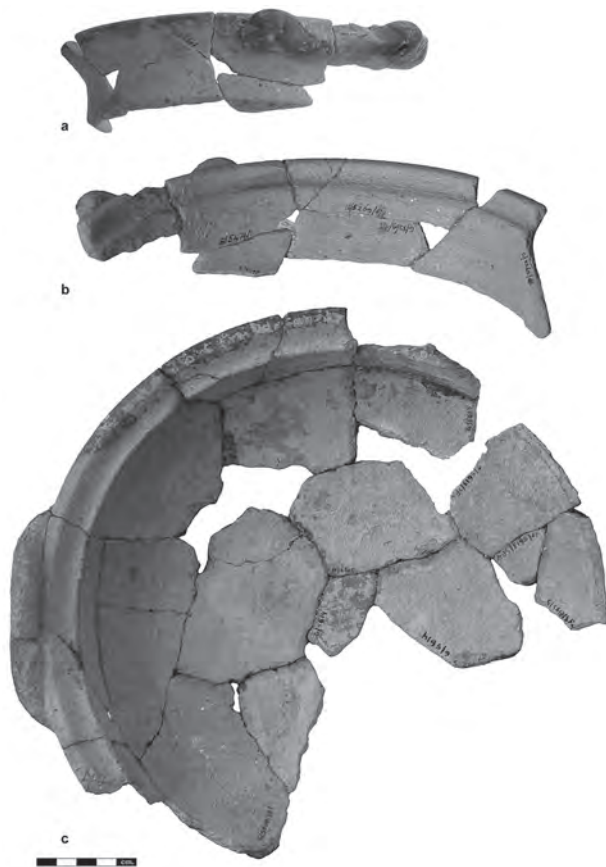


Figure 13.3. *Lopas*. a) 5269/SF4; b) 5474/1 & 5479; c) 5586/SF3. © Dutch Excavations at Geraki in Laconia.

is meant to be used for sautéing or gently “shaking” food over the fire, as the single handle renders the form fragile for lifting or major manipulation. Nor is the form steep-walled enough to permit stews or soups to cook easily. The complete example found at Geraki confirms a single handle for the form as opposed to what Catling (1996, 77) had tentatively postulated from the fragmentary Laconia Survey material. Flat-bottomed cooking pots with high-swung strap handles are rare in the Greek world, belonging instead more to the Roman. In the Greek world, the single-handled form has a rounded base and is thus thought of as a variation on the *lopas*.³ There is, however, an example from the Athenian Agora from a late Hellenistic/early Roman context (Rotroff 2006, 186, 315, no. 675) and there is a series from Cyprus that, although originally thought Roman, actually appears to begin in the 2nd century BC (Hayes 1991, 81–82). The number of examples of the shape that appear in the Hellenistic period excavation units from Geraki in conjunction with Catling’s observations in the Laconia Survey material indicate that the shape was a typical component of cooking assemblages in Laconia. The appearance of this form from at least the Classical period

(Catling 1996, 77) and its existence in many lots in Geraki, although not in large quantities, suggests that the food prepared in it would have been a regular component of the local fare diachronically and potentially across class, but not a food type found commonly elsewhere in Greece.

It is tempting to suggest that this form was used in cooking some form of flat bread – such as the *plakous* that we hear about in Galen (1.3) – but the uniqueness of the pan form would seem to imply some type of preparative method that was different from elsewhere in Greece. Another possibility is that the pan was used for some type of egg dish – and chickens are amongst those birds identified at the site, although the literary sources do not mention a specifically Laconian egg dish – or perhaps fish, although Geraki is far removed from any source of fish. The appearance of this flat pan form can be seen in conjunction with the continued presence at Geraki of the *lasana* (Fig. 13.5a), a pot stand for the fire, and the lack to date of brazier fragments, a form common elsewhere during the Hellenistic period, to suggest that there may be an inherent conservatism in how foods are being prepared in Laconia (Doulgeri-Intzesiloglou 1997, 73–74; Morris 1985; Papadopoulos 1992). Braziers have not been recognised to date within the Hellenistic deposits at Geraki, despite their popularity elsewhere, and the existence of fixed burned areas in the Hellenistic buildings at Geraki, suggesting the possibility of fixed cooking areas, may indicate that the brazier does not become part of the domestic equipment at the site (Rotroff 2004, 458). A final form related to food preparation and which appears in large quantities, if highly fragmentary, at the site is the mortar (Fig. 13.5 b–c). The shape is largely consistent across the examples appearing on the site and is deep, flat-based and steep-walled with visible black grits on most of the interior wall and floor. Thus, it is easily recognisable in deposits and is comparable to the material found by the Laconia Survey (Catling 1996, 73). Mortars may have been used to mix and crush aromatics or additives into some basic mush or paste – the crushing of almonds and walnuts, attested at the site, are another possibility, as a part of making *opsa* or fragrant sauces (Villing and Pemberton 2010; Rotroff 2006, 100).

Conclusions

This paper takes a first step in examining issues of food preparation and service in Laconia through a combination of literary sources, surviving foodstuffs, built structures and physical implements both imported and local. Preliminary conclusions from this combination of surviving evidence can then be used to create more focused research questions that can address the role of food in Spartan tradition, discipline and ideology.

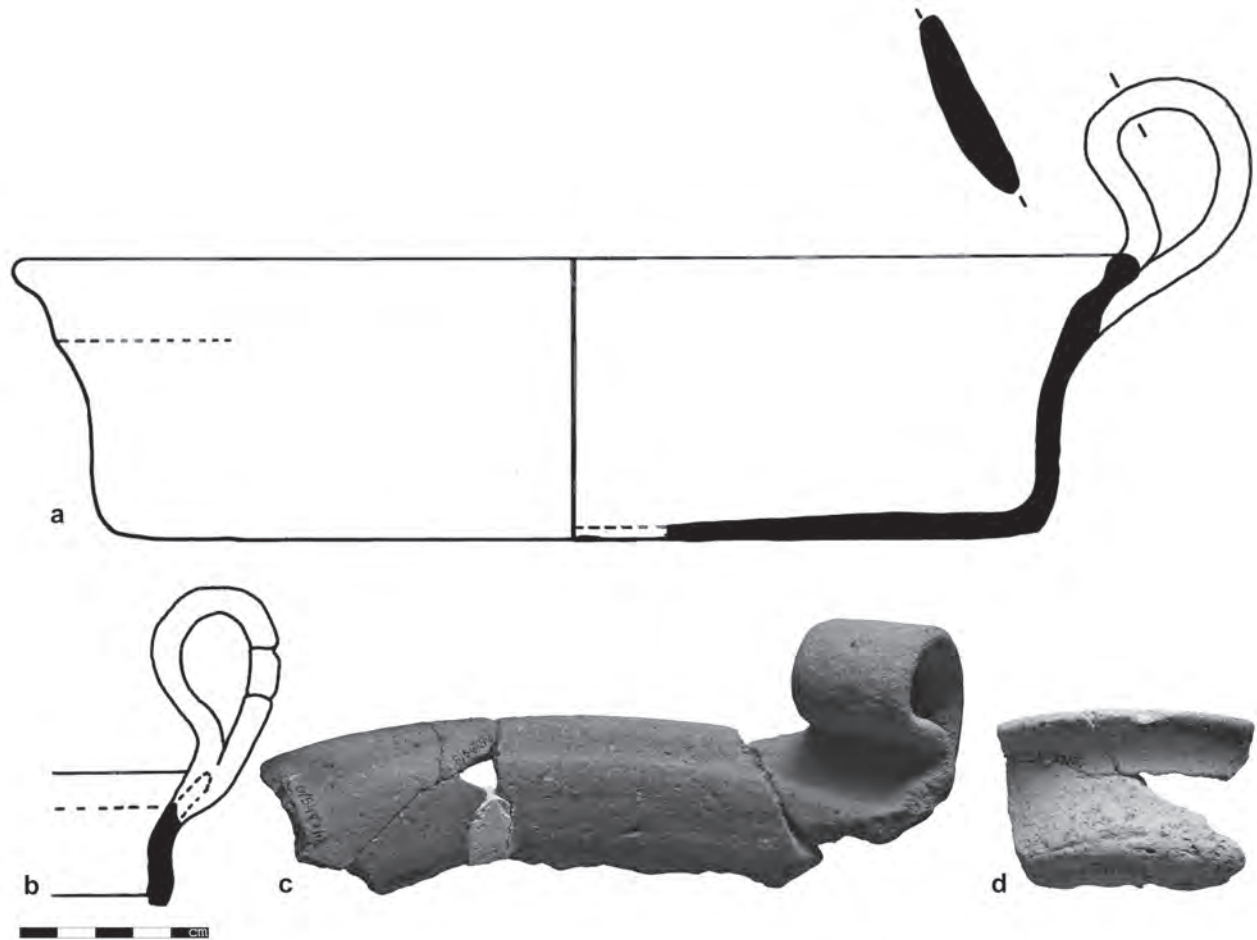


Figure 13.4. Flat-bottomed pan. a) 2583/SF1; b) 4582/SF3; c) 5065/SF2; d) 5179/SF1. © Dutch Excavations at Geraki in Laconia.

Although the literary sources may suggest a major change in how Laconians ate, with changes to the Spartan *diaita* in the Hellenistic period as noted earlier in this paper, this may not have affected what Laconians ate and how it was prepared (Phylarchus *FGrH* 81F44 [Ath. 141f–142b]). The foodstuffs found in the excavations at Geraki are similar to those mentioned in the literary sources, although the literary sources often refer to earlier periods. The foodstuffs found at Geraki are also similar to the basic foodstuffs found elsewhere in Greece at most periods. Cooking vessels that appear at the site are similar to those attested for earlier periods collected on the Laconia survey and the most prevalent forms are those that also exist elsewhere in the ancient Greek world. However, there are distinctive cooking pot forms, such as the flat-bottomed pan, that suggest that there were local peculiarities in how at least some of these common foodstuffs were being prepared. These observations suggest a series of possible productive research paths as we study the Geraki material more closely, to broaden exploration

of the material culture not only within Geraki but also further afield. The first is to explore the possibility that the distinctiveness of the Spartiate diet is that it does not foreground luxuries that might be expected of elites as is the case in other parts of the Greek world. The second is that Spartiate uniqueness might be the actual process of dining itself. Indeed, differences in serving vessels suggest that it may be in the serving of foods that the people of Laconia demonstrated differences from the majority of other Greeks. Both paths can be explored by refining our understanding of the Geraki deposits themselves and by searching for comparable domestic deposits from within Laconia that represent the different components of the population.

In fact, while it would be dangerous to speculate that Laconians were all eating similar foods to one another, and possibly to other non-elite Greeks, the material traces of what is found at Geraki suggests that the basic foodstuffs as prepared and consumed by those living in a town in the Laconian countryside are not that different from what is



Figure 13.5. a) *Lasana* 6087/SF1; b) mortar fragments 6453/SF1; c) uninventoried mortar fragments. © Dutch Excavations at Geraki in Laconia.

found in the literary sources on Laconia. Further work, especially with respect to scientific studies such as organic residue analysis or the analysis of butchering practices, amongst others, might be able to help pinpoint how food was being prepared. In particular it may be possible to identify certain of the foodstuffs that appear to be prepared in particular pots, like the unusual flat-bottomed pan, and this, perhaps, could help pinpoint peculiarities of diet in Laconia. Finally, coordinating research with other historical-period projects in Laconia could yield good results not only in giving depth to a broad-based chronological view of Laconian eating but also in seeing how consistent (or not) eating was across Laconia.

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Notes

- 1 See Braun (1995, 27–29) for a list of barley-based foods.
- 2 One of the rooms in House C contained a faunal assemblage of which 40% was pig bones whereas in other areas pig bones represented about 10% of the material. Something different appears to have happened in this room in House C that bears further scrutiny.

- 3 Sparkes and Talcott 1970, no. 1973; Pease 1937, fig. 36 no. 206 (restored with two handles); Kunze and Schleif 1944, figs 85–86 (in the latter figure, the handle is vertical as it is with the Geraki example); Jacopi 1932, 33 and 41, 73 fig. 79 with lid.

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FUEL, CUISINE AND FOOD PREPARATION IN ETRURIA AND LATIUM: COOKING STANDS AS EVIDENCE FOR CHANGE

Laura M. Banducci

In Tyrrhenian central Italy, ceramic cooking stands have been found in numerous contexts dating to the 1st millennium BC: among banqueting services, in domestic refuse deposits, in tombs and in sanctuaries. Despite their frequent presence on archaeological sites in the region, they have received only limited study. In 1969, Filippo Delpino was the first scholar to treat cooking stands as an independent functional ceramic group and attempt a systematic discussion of the various forms (Delpino 1969). This was followed in 1981 by Charlotte Scheffer's extensive catalogue of cooking stands throughout Italy (Scheffer 1981; 1982). Following Scheffer's study, only Andrea Zifferero and Elena Foddai have further considered these stands (Zifferero 1996; 2000; 2002; Foddai 2006). Morphological changes in cooking stands have been viewed as indicators of cultural interaction between Etruscans, Latins and Greek colonisers in Southern Italy. Zifferero remarks that cooking stand morphology must reflect "*acculturazione alimentare*" or "dietary acculturation" between neighbouring ethnicities in Italy (Zifferero 2000, 151; 2002, 61). To date, this idea has neither been explained nor examined in any depth. After outlining their typology and geographical distribution, this paper explores what cooking stand shapes might suggest about changes in diet and methods of food preparation and emphasises how morphological change needs to be understood in the context of the technological and socio-political climate of the era.

Typology

The classification of different types of cooking stands in central Italy has been based upon the perceived exposure to flame which the various forms afforded the cooking vessels that sat atop them. Type I includes four variants (Fig. 14.1; 1A–D) which all have a "diaphragm" of terracotta in between the heat source and the cooking pot. Holes through this diaphragm, or "hot-plate", allow for the ventilation of the flame and for hot air to reach the base of the pot, thereby permitting convective as well as conductive heating. Among reconstructable stands, the total height of 1A–1B ranges from 52 to 65 cm.¹ Type 1C is a smaller round stand with a flat top with four holes. Type 1D is similar; however, it has an elevated hot-plate supported by four arms rising from a flanged rim (Scheffer 1981, 31–35). The numerous examples of this variant range in height from 18 to 30 cm and the diameter of the raised platform ranges from 8 to 20 cm. The projecting flange can also add between 8 and 18 cm to the stand's upper diameter.² The chronology of type I is unclear. The beginning of production was somewhere in the late 14th to early 13th century BC; the variants subsequently fell out of use in different regions from the 10th to the 4th century BC (Scheffer 1981, 65).

Type II has three variants, which are crudely semicircular or "horse-shoe shaped" and have protruding supports to hold the cooking vessel. Type IIA has three supports that emerge at or below the plane of the rim, and it often

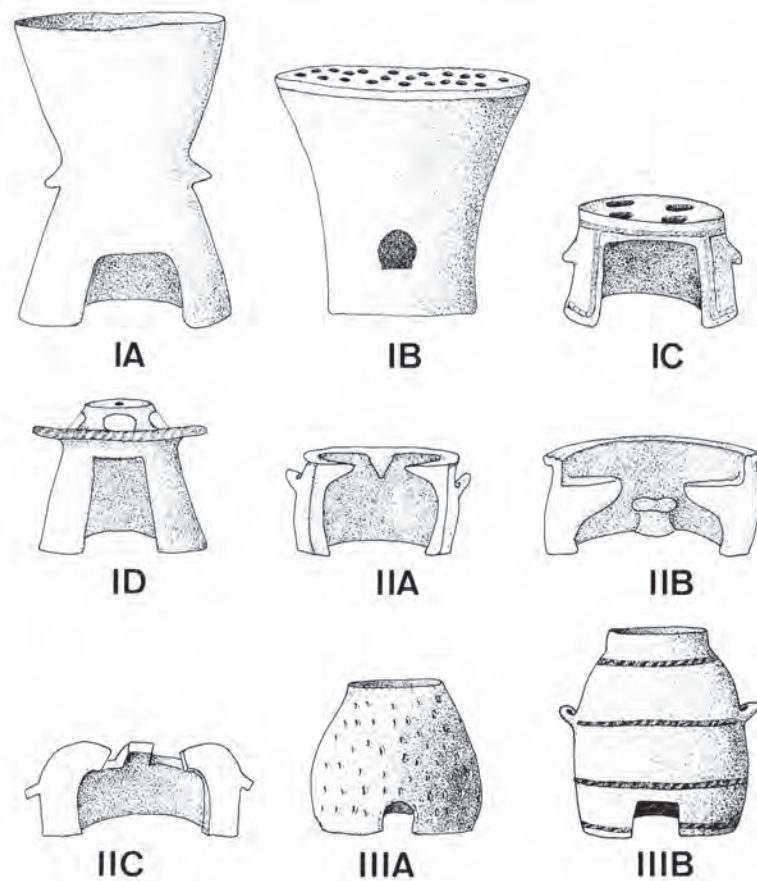


Figure 14.1. Scheffer's cooking stand typology. Scheffer 1981, 29, fig. 2. Courtesy of Swedish Institute in Rome.

has knobs on top of these supports to further elevate the cooking pot.³ The size range for all three variants is similarly from 15 to 20 cm in height (Scheffer 1981, 43; Brandt 1996, fig. 167; Murray Threipland and Torelli 1970, fig. 30; Zifferero 1996, fig. 1). Fragments of type II have been found in contexts dating from the beginning of the 7th through to the 2nd century BC in central Italy.⁴

Type III is characterised by its large tapered cylinder form, which is placed over a heat source. The top of the cylinder is open to accommodate a cooking vessel on its rim. The two variants range from 26 to 40 cm in height and have an opening of only about 15 cm. Scheffer lists only four examples. The problem in identifying this form or having substantial proof of its period of use stems from its similarity to pottery vessels; its fragments are difficult to distinguish from cooking vessel fragments. The known examples come from contexts in Etruria in the 7th and 6th centuries BC (Scheffer 1981, 52–54).

Cultural contact

If we map fragments of cooking stands in Italy we can identify a trend in the distribution of the various types: fragments of type ID have been found throughout the Italian peninsula, although they are concentrated in central Italy (Fig. 14.2); however, fragments of type II are found “only in central Italy” except for one still unpublished fragment from Pithekoussai⁵ and one fragmentary, but believable, stand of type IIB from Lipari, just north of Sicily (Fig. 14.3; Scheffer 1981, fig. 20). This Lipari example was dated by the excavators to the second Ausonian period (1150 to 850 BC) and is therefore difficult to relate to the later Italian examples.⁶ Beyond the Italian peninsula, the next-best Archaic context for cooking stands is in Athens. From the Athenian Agora there are several examples of cooking stands which, like type II in Italy, are open-mouthed “horse-shoe shaped” with no hot-plate intervening. They are simple hand-built single pieces of clay with two holes cut in their wall to allow for hot air to escape. Two come from early 7th-century BC contexts and one from a mid-



Figure 14.2. Distribution of types ID and II in Latium and Etruria from the beginning of the 7th century BC. After Zifferero 2000, fig. 16.5, updated with additions. Map Base © 2011, Ancient World Mapping Center (www.unc.edu/awmc). Used with permission.

6th-century context. After this, they appear only in the 2nd century BC Agora (Sparkes and Talcott 1970, 232; Rotroff 2006, 220–221).

Returning to Etruria specifically, the type ID cooking stand diminishes towards the end of the 8th century BC and is replaced in popularity by stands of type II from the 7th and into the 6th century BC. Zifferero attributes the

type's adoption to contact with southern Italian Greek colonies, citing the Pithekoussai fragment (Zifferero 2002, 61). He posits that this suggests a “dietary acculturation” in Etruria to Greek customs (Zifferero 2000, 151). He also notes the contrast between the situation north of the Tiber in Etruria and that of the Latin settlements south of the Tiber. Latin settlements maintained the use of type ID late,

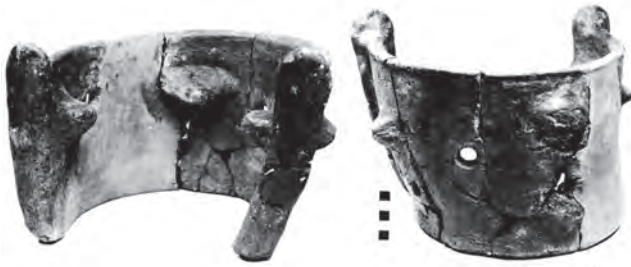


Figure 14.3. Type II cooking stand from Lipari. Scheffer 1981, fig. 20. Courtesy of Madeleine Cavalier.

until at least the end of the 5th century BC.⁷ There are very few examples of type II in Latium: one from Ficana, one from Castel di Decima, and fragments from four different stands in Fidenae, are all from very near the Tiber (Fig. 14.2). The appearance of type II in Latium could be directly attributed to Etruscan influence along this waterway – down especially from Veii where we have several fragments of type II (Brandt 1996, 272; Foddai 2006, 27; Torelli *et al.* 1970, fig. 30). Thus the Tiber, as the natural border between Latium Vetus and Etruria, presented opportunities for both communication and division (Aigner-Foresti 2001, 79; Bietti Sestieri 1992, 240).

While the trends in this distribution pattern are striking, assumptions about “influence” warrant further scrutiny. Firstly, to consider Iron Age Italian drinking and dining customs as derivative of Greek customs, instead of part of larger trends throughout the Mediterranean, introduces complex hellenocentric assumptions.⁸ Secondly, the mechanism for this “influence” needs to be articulated. Do we imagine that cooking stands of type II were made in one place, a few were exported and became popular for the foodways associated with them, and then began to be made locally? Do we imagine travelling craftsmen created cooking stands in different towns or regions? It is fruitful here to investigate the material practicalities of cooking stand design and techniques of production and distribution.

The method of production plays a role in the articulation of “influence”. Unfortunately, it is unclear if cooking stands of types I, II and III were hand-built or wheel-made. According to Charlotte Scheffer, all of the examples of all three forms she has examined appear to be hand-built (Scheffer 1981, 31, 43, 52). J. Rasmus Brandt reports that the stands from Ficana appear to be made by coiling (Brandt 1996, 273). Foddai’s examination of the stands from Fidenae concludes that all four of her examples of type II were wheel-made (Foddai 2006, 12). Of her eleven examples of type ID stands, eight appear to have been thrown on a wheel (Foddai 2006, 16). This is not impossible. Wheel-production began in some regions of Italy as early as the 8th century BC and Type ID’s effectively cylindrical body could have

been wheel-made with the various ventilation openings cut out when the forms were leather-hard (Nijboer 1998, 100–101). Foddai suggests that a lack of standardisation of these forms indicates that cooking stands were made at a small scale domestic level (Foddai 2006, 26). In stark contrast, Zifferero identifies the use of the wheel in some cases as evidence for the specialised production of cooking stands.⁹ The examination of the surface treatment of the stands could contribute to our interpretation of whether or not they were specially produced; yet, even on this point, the examination of fragments is inconsistent. There is a white film on the surface of many type II fragments from Acquarossa, which Scheffer understands to be some kind of resin or slip, yet T. Wieselgren interpreted this same substance as fire damage (Scheffer 1981, 46–47, n. 59; Scheffer 1982, 42–43, 67–68; Wieselgren 1969, 29). Stands from Ficana also seem to be coated with a pale slip (Brandt 1996, 274). The few examples I have examined of type ID from Gabii have a lumpy, hand-built quality. They lack any surface treatment, being neither burnished nor slipped. The variability in how scholars have interpreted the construction method of stands from different sites suggests that the production and treatment of cooking stands was not standardised.

The only cooking stands to have been found associated with a production site come from the kilns at Satricum. Kiln A, built in the 7th century BC, contained misfired bowls, jars and cooking stands, all with a similar ceramic fabric (Nijboer 1998, 115, 117; Attema *et al.* 2001–2002, 371). The cooking stands are all of Scheffer’s type I with several examples of type ID. In his study of production sites across this region, Albert Nijboer concludes, “based on the primitive kiln construction and the character of the pottery produced, the mode of production at Satricum should be interpreted as household industry” (Nijboer 1998, 119).

The case for localised or domestic production undermines the view that this form of cooking stand influenced the development of similar forms across towns and regions in the Italian peninsula. That is, it is less likely that wares produced at a small scale for local consumption would go on to be part of a network of cross-cultural trade and use, than if they were produced in specialised workshops and then sold. Likewise, if their method of production was not standardised it is less likely that individual skilled artisans were travelling around peddling them. Yet type I, especially variant ID with its raised hot-plate, has quite a complex form, and examples from different areas often have similar finger-pressed cordon decoration (Fig. 14.4).¹⁰ The shape’s relative complexity and the standardisation of its decoration may support a claim for more specialised production; its distribution over a wider area in Italy may also support claims that it is a cooking stand with a “multi-cultural” presence. Nevertheless, because of its



Figure 14.4. Type ID from the Regia in Rome. Scheffer 1981, fig. 10. Courtesy of the American Academy in Rome.

perceived abandonment by Etruscans as a result of Greek influence, the possibilities for its origin, production and trade have not been the focus of any scholarly discussion. In contrast, type II's horse-shoe design does not appear to be an innovative or unique shape. While its variants from around central Italy are relatively homogeneous and become even more so after the 6th century BC,¹¹ there is a very real possibility that this basic form was developed independently in Etruria and in Greek areas.

Cooking vessels

Several lines of evidence can contribute to an assessment of the idea of “dietary acculturation”. First, we need to examine the technological implications of the cooking stands’ design – how, or if, different stands affect the transmission of heat, the kinds of vessels they could support, and the kinds and quantity of fuel suitable for different forms. Only then can we consider contemporary social change and food change. All of these factors must be contextualised within broader technological and socio-political developments from the 9th to the 6th centuries BC in central Italy.

Before considering the ancient possibilities, it is helpful to be acquainted with the challenges faced by designers of modern “cooking stoves” for the developing world (Fig. 14.5). These devices are nearly identical in scale and use to our cooking stands. In December 2008, *The Economist* news magazine reported:

Even if they get the thermodynamics and materials right, designers must also make the devices compatible with local foodstuffs and cooking habits. ... A lack of field testing ... meant a lot of stoves were simply unsuited to users’ needs. The difference in cooking styles between countries ... can determine how – and whether – a new stove design ends up being used.

In the refugee camps of Darfur, the dough for the staple food, *assida*, requires vigorous stirring of the cooking pot. ...



Figure 14.5. A cooking stove in present-day India. © Envirofit International 2010.

Only after the stoves were seen to tip over during cooking did ... researchers go back to the drawing board and refine the design. ... The original stoves had been designed to boil water, but researchers found that for each meal, two-thirds of the fuel was used to make sauces by frying onions, a process that requires a more intense, continuous heat. One criticism of [another style of] stove is that it does not get hot enough to make traditional Indian breads.¹²

These modern observations reveal that not only do food choices have an effect on cooking stand design, but cooking vessels and fuel use must also be taken into account.

Vessel fabrics

Our knowledge of cooking pots in Iron Age central Italy is limited to a small amount of morphological information and limited petrological study. Ceramic petrology has the potential to contribute to our understanding of ceramic thermal conductivity, that is, the ability “to distribute the heat within a vessel evenly”. If a vessel has low thermal conductivity it would mean that hot-spots develop, potentially causing the food to burn.¹³ The ceramic petrology from the excavations of ancient Satricum, at Borgo le Ferriere in Lazio, and the surrounding surveys of the Pontine Region Project provides the most comprehensive analysis of ceramic fabric composition in this period. In an effort to understand the vast amounts of early pottery from the survey, the Lazio Ceramic Research Project (LCRP) from the Groningen Institute of Archaeology created a detailed and systematic typology of the local forms and fabrics from the excavations (Attema

Table 14.1. Three different fabrics from Iron Age Satricum (Attema *et al.* 2001–2002, 371).

	Fabric 1	Fabric 2	Fabric 6
nos of frs	1634	676	157
Date of attestation	9th to 5th/4th century BC	9th to 6th century BC	late 7th to early 6th century BC
Forms produced	jar, storage jar, miniature jar, miniature cup, bowl, large bowl, lid, plate, mug, holmos, cooking stand, spindle whorl, spool, loomweight, tile	Jar, storage jar, lid, cup, bowl, amphora, holmos, cooking stand, sieve, spindle-whorl, spool, tile	jar, storage jar, miniature jar, bowl, large bowl, calice, lid, plate, cooking stand, stand, tile, cover tile, acroteria, small terracotta head

et al. 2001–2002; see also Maaskant-Kleibrink and Attema 2001). Analyses focused on pottery from stratigraphically dated contexts ranging from the 9th through to the 4th century BC, including the 7th-century kiln mentioned above and several other cooking stand locations (Attema *et al.* 2001–2002, 371–376). Three fabric categories – 1, 2 and 6 – date to our period of interest and were used for a variety of different vessel forms (Table 14.1).¹⁴

Fabric 1 is described as turning red-orange when re-fired, being dominated by quartz and feldspar inclusions, and having a large variety of sizes of inclusions (from “big” to “absent”) which are “medium to very poorly sorted”. The inclusions make up more than 20% of the matrix. Material in this fabric comes from contexts of the 9th to the 4th century BC, but the majority of fragments come from 8th- and 7th-century areas. Fabric 2 is identical to Fabric 1 in its type and variety of inclusions; however, it is classed as “medium to poorly sorted” and is composed of 10 to 20% inclusions. Material in this fabric comes from the 9th through to the 6th century BC. The use of Fabric 6 begins slightly later, in the late 7th and early 6th century. It is characterised by quartz, feldspar, tuff and augite inclusions, but these are much finer particles. These inclusions are “well-sorted” and make up more than 20% of the matrix.¹⁵ This fabric is the earliest example of what the LCRP label as “coarseware” as distinct from the “*impasto*” of Fabrics 1 and 2 (Maaskant-Kleibrink and Attema 2001, 421; Nijboer and van Oortmerssen 2002).

While the array of clay characteristics contributing to thermal shock resistance are increasingly well understood,¹⁶ conditions affecting thermal conductivity are much less established. Experimental trials of ceramic thermal conductivity on both calcareous and non-calcareous clay have observed that quartz temper, especially in angular particles, seems to substantially increase thermal conductivity. The porosity caused by the temper and the orientation of the pores together has a great effect on thermal conductivity.¹⁷ Hein *et al.* note that granite temper making up around 10% of the clay matrix increases conductivity in clay fired at 550°C and 850°C; however, when the quantity of temper exceeds the 20 to 30% range, it creates elongated pores in the clay which reduce

thermal conductivity below the point at which the vessel would have been without the addition of temper (Hein *et al.* 2008, 41–42). Ceramic kilns in ancient Italy would have reached temperatures of between 680°C and 1075°C, with the “sufficient temperature” being about 850°C. At higher than 1000°C, one risked misfiring and deformation (Nijboer 1998, 109; Olcese 2003, 22–23; Cuomo di Caprio 2007, 497; Hein *et al.* 2008, 42). The thermal conductivity of non-calcareous ceramics with either granite or phyllite temper fired at 1050°C is below that of non-tempered ceramics because of the high degree of vitrification of its microstructure. Similarly, tempered calcareous clay fired at 1050°C has lower thermal conductivity than when it was fired at 550°C or 850°C.¹⁸

According to these estimates of the effect of temper and clay quality on thermal conductivity, Fabric 2 and possibly Fabrics 1 and 6 from Satricum could have had quite excellent thermal conductivity. Yet given the variety of forms (for cooking and otherwise) created with these fabrics and their overlapping chronological range, it is difficult to attribute conscious technological choice to their percentages of quartz and feldspar inclusions. It is tempting to highlight the development of Fabric 6 as contemporaneous with the change in cooking stand design; however, with the state of our knowledge of ceramic thermal conductivity being in its infancy, it is difficult to speak to the effect of Fabric 6’s combination of fine tempers in comparison to its coarser, but quantitatively much more-attested siblings.¹⁹

Vessel morphology

If we turn to the kinds of vessels that various cooking stand forms could support, it is clear that cooking stand type IA would be most suited to holding only deep *ollae* which fit into its basin.²⁰ Variants IB and IC, with their 30 to 50 cm flat perforated hot-plate, would have been able to support a single large basin, or a shallow wide pan, or multiple smaller pots.²¹ Type ID would have been able to accommodate a variety of different pots: deep *ollae* or open-formed pans. These pots, however, would have had to have a flat bottom (Fig. 14.6). The flanged area of type ID

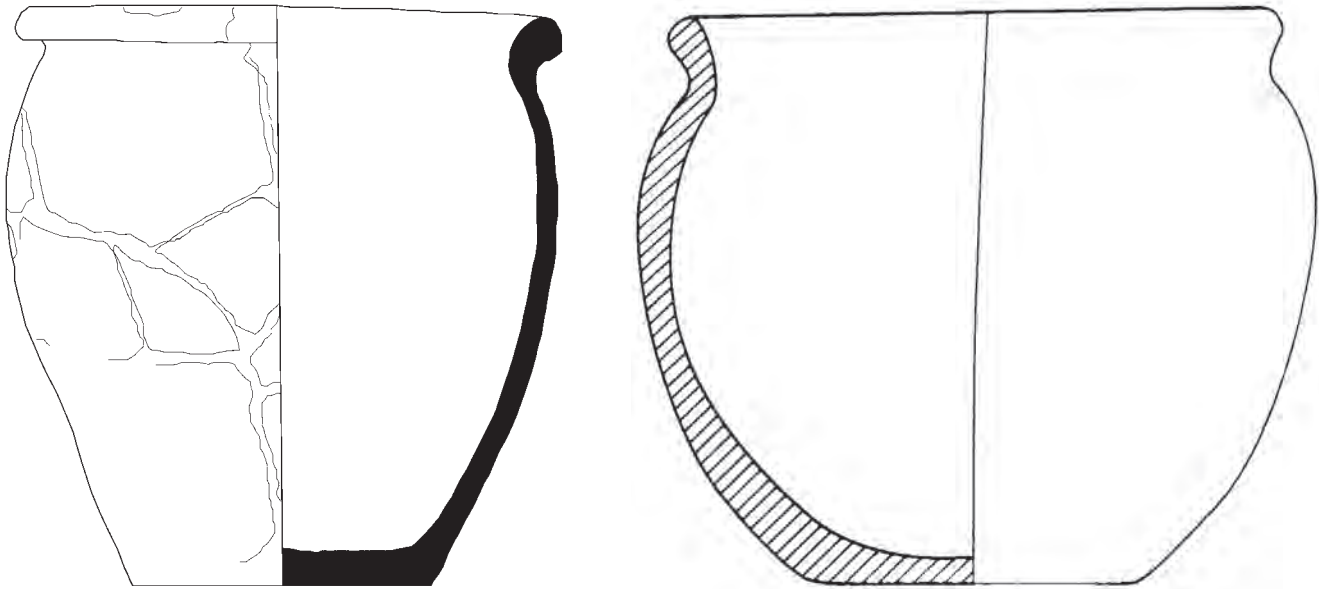


Figure 14.6. a) Wide *olla* with flat bottom from Roselle (750–590 BC). Donati 1994, fig. 9, no. 73. Used with permission. b) Tall narrow *olla* with flat bottom from Murlo (7th–6th centuries BC). Bouloumié-Marique 1978, pl. XVIII, no. 536. Courtesy of École française de Rome.

may have also been functional: providing more horizontal space along the edges around the hot-plate on which to rest additional smaller vessels or food to be heated or reheated without a container.

Type II cooking stands would have allowed more direct contact between the cooking vessel and the fuel source; however, the shape of this type also limits the possibilities for vessel usage. Since there is no hot-plate on which to place pots, the best pots for this form were those that are large and deep enough to balance on the three protruding supports. They could have had a rounded bottom, or, like some impasto *ollae* and bowls, a flat but very narrow bottom (Fig. 14.6).²² Type II could have accommodated a flat wide pan, but it would have to have rested directly on the stand's rim, allowing very little air circulation for the proper ventilation of the fire and for the even heating of the food inside the vessel.²³ Zifferero, who creates subgroups of type IIA, recognises this problem when he observes an increase in the downward tilt of the supports which sit directly along the rim of his “Caeretan” variant (Zifferero 1996, 195). The eventual addition of knobs on top of all of the supports raised the cooking vessel up off the stand's edge slightly to increase ventilation and allow the necessary gases to be released to keep the fuel burning.

Cooking fuel

Modern studies of fuel change in developing areas of sub-Saharan Africa note that periods of urbanisation and

population growth often go hand-in-hand with fuel change and, specifically, an increase in charcoal use (Bailis *et al.* 2005). Several factors in our period of focus in ancient Italy suggest that a similar change from firewood to the increased use of charcoal may have occurred. Firstly and most simply, the late 8th and early 7th centuries BC were periods of major urbanisation in Etruria and Latium (Bietti Sestieri 1992, 241–243, 248; 2005, 20). Then, in terms of technological change, the beginning of the Iron Age in central Italy is dated variously to the 9th century BC down to the 8th or 7th century BC (Snodgrass 1980, 361; Nijboer 1998, 230). The clearest evidence for iron objects employed as everyday tools comes from the Etruscan city of Veii from graves dating from 800 to 760 BC (Snodgrass 1980, 361; Nijboer 1998, 200). The expanded use of charcoal in the ancient world is a prerequisite for iron smelting because of charcoal's ability to reach a higher temperature for smelting iron ore than wood can.²⁴ Archaeological data suggests that some iron objects were produced as early as the late 13th century BC; therefore, the charcoal to produce iron existed to some small extent (Giardino 2005, 494, 496). In Imperial Rome, urban fuel use is traditionally estimated to be 80% charcoal and 20% wood.²⁵ Unfortunately, in the pre-Roman period knowledge about the use of charcoal as fuel is limited to what we can extrapolate from metallurgy and this is therefore not well understood.²⁶

Notably, iron production and tool use do not seem to have occurred at drastically different times or intensity in Etruria compared with Latium.²⁷ So although the inhabitants of Latium did not alter their cooking stand

form until several centuries later than people in Etruria, they could have just as plausibly used charcoal in increased quantities.

The feasibility of charcoal use within an increasingly urban system is supported by the fact that charcoal is much easier to transport than wood. Although charcoal shrinks to only about two-thirds of the volume of the wood used to make it, because of its porosity, its weight is only 25% of the original wood (Healy 1978, 150). Furthermore, charcoal can reach much higher temperatures than wood and has double the calorific potential of dry wood (Olson 1991, 412; Veal 2012b, 236). Charcoal also releases less smoke and fewer pollutants (carbon monoxide and particulate matter) and is therefore better for air quality in populated areas (Groupe Energies Renouvelables, Environnement et Solidarités 2009, 38; Bailis *et. al* 2005).

With these possibilities for fuel use outlined, we can begin to hypothesise the consequences of the change from type ID to type II in Etruria and, eventually, in Latium.

Cooking stands and foodways

The most explicit discussion of the implications of ancient Italian cooking stand design comes from Salvatore Puglisi in 1959. His publication of the excavation at Pertosa, near Naples, reported fragments of what would later be labelled a type ID stand. He discusses the merits of the hot-plate and its ability to provide controlled heat from the fire source and to protect delicate food from burning (Puglisi 1959, 39–40). Puglisi's anecdotal observations come in the context of the pastoral community's cheese production. The temperature of the milk needed to remain between 32 and 50°C while the coagulate was added. Since it would have been relatively "difficult to regulate the intensity of an open flame", a stand of type ID would have provided protection for the cooking vessel and low heat.²⁸ The adoption of type II would have meant a loss of this control if it was used with wood fuel.

Yet, type II stands possess several features which engineers of modern cooking stoves note as desirable in their own designs (Fig. 14.7). The use of type II with either wood or charcoal as fuel would mean that there is direct surface area contact between the fuel and the pot – this means that the fuel use was more efficient because "the exchange of energy between flame and pot is proportional to the surface in contact with the fire ... [the less area in contact, the more] substantial loss of energy" (Groupe Energies Renouvelables, Environnement et Solidarités 2009, 9).

Regarding the design of the fuel opening, which in the case of type II is an opening taking up one side of the stand, we can again point to efficiency. The air intake



Figure 14.7. Modern cooking stand designed for efficient charcoal use by the "Cambodia Fuelwood Saving Project". © GERES.

entrance must be large enough that "combustion takes place efficiently right across the charcoal bed and the heat rises uniformly around the pot".²⁹

Since charcoal is much easier to spread around and burns evenly at a higher temperature, if charcoal is used, a hot-plate is not needed to regulate the temperature contact with the pot. Using wood fuel without a hot-plate risks uneven heat transferred to the pot as a result of a potentially heterogeneous mixture of wood (different shapes, sizes, wood types, dryness levels). With type ID, in order to heat the cooking pot and the food within it, hot air would travel through the holes surrounding the hot-plate to the base of the pot and the flame would heat up the hot-plate itself. Then, through conduction, the hot-plate would heat the base of the pot more evenly. Assuming no change in the thermal conductivity of the cooking vessels, it is with the use of charcoal that removing the hot-plate from the cooking stand is most appropriate – a high temperature can be attained, the air inside the cooking stand is heated evenly and so are the base and sides of the cooking pot.³⁰

Even if the users of type II were not universally employing charcoal as their fuel, the increased size of the fuel opening and the increased space around the pot meant that fuel consumption was more efficient, and heat transfer to the pot more direct. It follows that raising the temperature of the liquid inside the pot would happen more quickly. However, the food cooked with these cooking stands was likely not pure liquid – people were not just boiling water. The solid foods cooked over these stands would have been significantly affected by the change in temperature that they were receiving.

We know that the diet of Iron Age central Italy was primarily based on grains and legumes. Meat would have been eaten, but probably not very frequently by the large

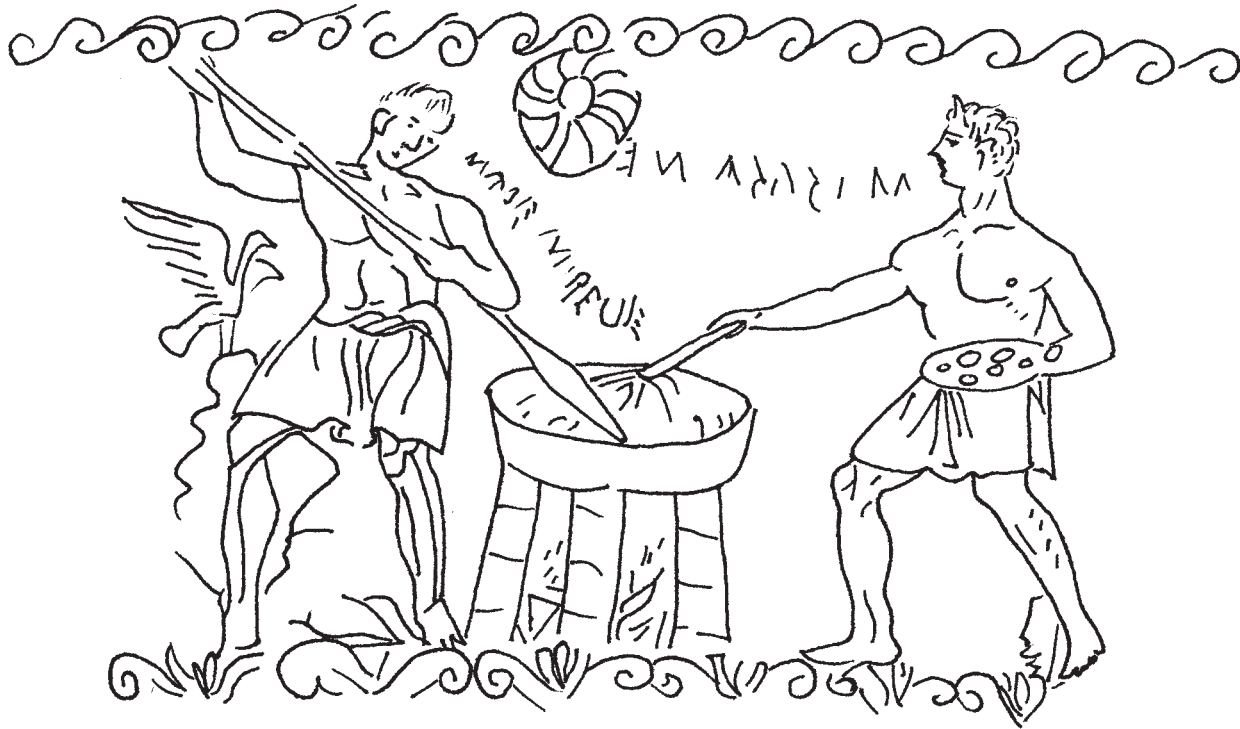


Figure 14.8. Engraving on a late 2nd-century BC *cista* from Praeneste, now in Brussels, Musée du Cinquantenaire inv. A 1159. After Duvau 1890, pl. VI.

majority of the population of modest financial means. Consumption of meat would have been reserved mainly for occasions of sacrifice and festival days (Barbieri 1987b, 49). Fish seems to have been more readily available and consumable; however, we have few faunal remains of fish from excavations of Etruscan sites.³¹ We have already seen that deep *ollae* are most appropriately accommodated on type II cooking stands. A cooking pot which is at least as deep as it is wide is useful for food with a high liquid content, since a vessel which reduces its contents' surface area would cause the liquid to evaporate more slowly.

Deep vessels would be appropriate for preparing stews and broths of grains and vegetables with some meat, and porridges. Emmer wheat, especially, has been found in pre-Roman contexts throughout Italy (Costantini and Costantini Biasini 1989; Motta 2002; Robinson 2002). Emmer, modern Italian *farro*, is used most popularly in thick risotto-like soup, which requires low heat over a long period in order to cook properly.³² A change in exposure to heat suggests a change in diet to foods which can resist higher temperatures before burning, or a change in the preferences in the quality of cooked food – drier porridge, thicker stew.

Food preparation time

It may also be that a cooking pot that is sitting on a more moderate constant heat would also require less constant maintenance – less frequent checking and stirring. Differences in cooking stands might then be related to the length of cooking time and the requirements of food tending. Although the use of type II stands may have required more maintenance – constant stirring so porridge did not stick to the bottom and burn – a higher temperature may have cooked the food faster. Perhaps the change in cooking stands from type ID to type II suggests something about preparation time in relation to the foods being cooked. There is a potential shift in time priorities: more maintenance and less preparation time was desired.

Those in the household who were doing the cooking could spend less time doing it. In addition to urbanisation, the 8th and 7th centuries BC witnessed the emergence of substantial social stratification in southern Etruria and later, in Latium (Bietti Sestieri 1992, 241–243, 248 and 2005, 20; Pacciarelli 2000, 273). The grave goods of the urban elite suggest that there was an attempt to indicate non-kin group social distinctions. The earliest suggestion of slavery in Etruria may come from 6th-century BC tomb paintings,

and certainly later in Etruria we have visual evidence of slaves serving food.³³ A much later, but illustrative, scene from a *cista* from Praeneste shows two men stirring a large vessel standing on supports over a fire (Fig. 14.8; Barbieri 1987a, 121). We notice the wide shallow pot full of some kind of stew and we see that the man on the right may be about to add a plate of something into the mix. Next, we can observe the constant stirring of the pot. Both of these men are clothed in *perizoma* or “loin cloths”. The depiction of these individuals doing work while minimally clothed suggests their servile status (Bonfante 2003, 28–29). Once the switch to type II cooking stands occurred, servants such as these would have been in a position to stir whatever food material needed to be watched over at high temperatures.

Conclusions

This excursus on cooking stands illuminates some of the ways in which this functional group can be used to study change in early 1st-millennium BC Italy. Now that typologies have been canonised, we can begin to draw out more information from them. Many of my suggestions are speculative for now, and require additional data to fully evaluate. While the notion of dietary change is an alluring and not unfounded suggestion, it can only be reasonably considered along with a close examination of technological and resource developments and social changes affecting cooking methods.³⁴ This study has also demonstrated the inextricable need for multi-disciplinary collaboration in cooking stand studies. While the change in cooking stand morphology is notable, we need to consider whether the thermal properties of cooking vessels and fuel resources also changed. It is with the further collaboration of petrologists, anthracologists and, interestingly, combustion engineers, that cooking stand studies can be advanced.

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Notes

- 1 Scheffer 1981, 37. There is only one (or perhaps two) fragment(s) of this shape from Acquarossa itself and they are far too small to reconstruct the stand’s size: Scheffer 1982, 12 and fig. 66.
- 2 See examples from Guidi 1998, figs. 20, 21; Brandt 1996, figs. 165, 166a; Murray Threipland 1963, fig. 24; Foddai 2006, fig. 9.
- 3 Scheffer 1981, 43; Zifferero also defines more extensive sub-categories of this variant (Zifferero 1996).
- 4 Acquarossa, Fidenae and Ficana are from the beginning of the 7th century BC (Scheffer 1981, 71, figs. 11–19; Foddai 2006, 12; Brandt 1996, 19, 275), while Zifferero has examples from Cerveteri which are from contexts as late as the Hellenistic period (1996, 184–185, 197).
- 5 Scheffer 1981, 73. Scheffer thanks G. Buchner for showing her the material and cites Buchner 1970–1971 and Klein 1972, which are summary excavation reports with no finds (Scheffer 1981, 51). The current Ischia Museum Catalogue lists two cooking stands from the “età del ferro”. One is similar to type IA and the other is a variant of type IC or maybe type II in terms of its openness, but it is not a horseshoe: Buchner and Gialanella 1994, 39–40 and figs. 7 and 8.
- 6 Bernabò Brea and Cavalier 1980, 631, fig. 119, 710–712. Scheffer recognised the difficulty of connecting these two disparate places and periods, suggesting perhaps a Phoenician intermediary form. Scheffer 1981, 71–72.
- 7 Zifferero 2000, 151; see Carafa (1990, 102–103) for examples of ID in Rome.
- 8 Post-colonial scholarship has begun to deconstruct the concept of hellenocentrism which purports, often implicitly, that art and innovation in the ancient world came from Greece (see, e.g., Morel 1984; De Angelis 1998, 2004; Vasunia 2003). Directed discussions of hellenocentrism and foodways include: the cultural *koine* of dining in early Italy, Greece, and the Near East by A. Rathje (1988 and 1990); the complications of Etruscan banqueting practices as they relate to Greek practices by J. P. Small (1994).
- 9 Zifferero 1996, 191, n. 20. The coarseness of the fabric of cooking stands of type I found in Satricum, however, suggests that they would have been difficult to throw on a wheel, if not impossible. For fabric discussion see below.
- 10 Examples with this same decoration include stands from Acquarossa, Veii, Ficana, Fidenae, the Regia and the Cermalus in Rome, San Giovenale and Luni sul Mignone.
- 11 See especially the 6th-century and later fragments from Caere and Veii (Zifferero 1996).
- 12 “Fresher Cookers”, *The Economist*, US Edition., 6 December 2008. For the details of decisions behind the design of these stoves, see the “Development and Testing Report” of the Berkeley Darfur stove project at cookstoves.lbl.gov/darfur-archives/pdf/dsp2008.pdf.
- 13 Müller *et al.* 2010; Müller *et al.* this volume.
- 14 The remaining 10 fabrics identified from Satricum are either post-6th century BC or appear to be serving or table ware based on their form, the composition of their fabric and their lack of traces of contact with fire.
- 15 Attema *et al.* 2001–2002, 371, 374 using the coding legend from fig. 21.
- 16 Bronitsky and Hamer 1986; Tite *et al.* 2001, 319–320; Olcese 2003, fig. 17; Müller *et al.* this volume.
- 17 Elongated inclusions may also increase the strength of the vessel (Müller *et al.* 2010, 2461).
- 18 Hein *et al.* 2008, 40–41; Müller *et al.* this volume.
- 19 The lower number of sherds in Fabric 6 when compared to Fabrics 1 and 2 may be because of the 6th-century “discontinuity” at Satricum. There were very few sealed deposits attributable to this century on site. Therefore, most of the ceramic material has been dated between the 9th to 7th and the 5th to 4th centuries BC. Attema *et al.* 2001–2002, 288.
- 20 The study of Iron Age cooking vessels in central Italy is limited to a handful of site-specific morphological studies. The most recent

appear in the volume edited by Rendeli (2009). No systematic use-alteration studies noting blackening from fire damage have been undertaken.

- 21 It is also worth noting IB's tall top-heavy shape, which makes it appear to be extremely impractical to be a cooking stand at all: it looks as if it would topple over if a pot were placed on top of it. Perhaps food was placed directly on the hot-plate of IB and grilled.
- 22 Parise Badoni 2000, see *olla* pl. XXX and *scodella* pls. XLIX and LI.
- 23 If, that is, the cooking vessel used had low thermal conductivity.
- 24 Meiggs 1982, 204. Iron ore smelting requires hotter temperatures than both silver and copper oxides. Nijboer 1998, 225; Sim 1998, 12.
- 25 This is based on the Pareto Principle (Veal 2012a, 41, n. 95).
- 26 Anthracology in the past has focused on palaeoenvironmental reconstruction rather than fuel sourcing (see, e.g., Fiorentino and Magri 2008). With the growing interest in anthracology from a fuel economy perspective, it is hoped that data from the Iron Age will increase (Veal 2012b, 227). Furthermore, though previously it has not been possible to determine whether archaeological charcoal represents the remains of burned wood fuel or charcoal fuel, the development of the reflectance method has the potential to elucidate this and clarify our understanding of fuel sourcing from the archaeology (McParland *et al.* 2010).
- 27 Nijboer 1998, 231–232. This is contra Snodgrass (1980, 262) with new evidence.
- 28 Puglisi 1959, 40. Although Scheffer rejects this cheese-making idea (Scheffer 1981, 103 n. 353), my interest in Puglisi's suggestion is his attempt to link the practicalities of specific foods to these devices, something from which later scholars have shied away.
- 29 Groupe Energies Renouvelables, Environnement et Solidarités 2006, 2. In a tomb at Quarto di Monte Bischero in S. Marinella/Severa, 15 cooking stands of type II and two pairs of bellows were found. This material was never published (Scheffer 1981, 51). The presence of bellows indicates that pre-Roman Italians could control the flame and fan it as Olson (1991, 412) suggests about Greek cooking practices.
- 30 James Skibo's study of the cooking practices of the Kalinga people in the Philippines notes that when cooking rice in a ceramic pot on an open fire, the pot is taken off the fire after the water begins to boil and put on charcoal sitting next to the fire. The top of the flames are too hot and irregular to lick the bottom of the rice pot. Skibo 1992, 67–70.
- 31 Gianfrotta 1987, 55, 57. This is probably due to lack of sieving on many Italian excavations in the past.
- 32 Modern recipes call for one to three hours of slow simmering for whole *farro* grains (as distinct from *farro spezzato*): Fazzi 1994, 13–14.
- 33 Harris 1971, 129; Rastrelli 2005, 52; Barbieri 1987a, 119–120. Daphne Nash-Briggs imagines slaves in Etruria as early as the 8th century BC based on parallels with the Homeric world. Briggs 2002, 153.
- 34 Equally, with any archaeological reconstruction of foodways, faunal, palaeobotanical and archaeochemical evidence also contribute substantially to ceramic examinations.

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VIVARIA IN DOLIIS: A CULTURAL AND SOCIAL MARKER OF ROMANISED SOCIETY?

Laure G. Meulemans

Introduction

This paper aims to examine the social, economical and cultural significance of an unusual kind of container, the so-called *vivarium in doliis*, used in Roman times to rear dormice. As part of our research on unpublished ceramics unearthed in the Elsa Valley,¹ located on the eastern border of the *ager Volaterranus* (Fig. 15.1), we studied objects preserved in the storerooms of the San Gimignano Archaeological Museum.² This brought to light four sherds with distinctive features (Fig. 15.2). The fragments are reminiscent of *opus doliare* in that they have thick walls (2–3 cm), are shaped in rough clay, are hard in texture, and are rich in inclusions. The inner wall of three of them displays a horizontal prominent projection of about a hand's width. Closely spaced circular holes with a diameter of 1 to 1.5 cm are positioned in a horizontal line above the projection. The fourth sherd has an external arc-shaped horizontal projection below a hole similar to those found in the other three fragments.

The presence of apertures in the walls of these fragments could evoke the *ollae pertusae* or *ollae perforatae*,³ containers used for agricultural purposes such as transplanting small ornamental plants, sowing (Plin. *HN* 17.64), layering,⁴ or transporting tree species over long distances (Plin. *HN* 12.16). It is usual for these small globular *ollae*, with an average diameter of about 20 cm, to possess one hole in the centre of the bottom and three others in the lower part of the wall. The apertures are relatively broad and elliptical, and would have been made using a wooden stick to pierce the fresh clay from the inside, leaving a small piece of clay on the outer side of the wall. The clay

is depurated (Consalvi 2008, 101), and beige or pink in colour; the outer wall is usually covered by a whitish slip. However, the sherds found at San Gimignano may be clearly differentiated from this type of ceramic due to their much larger size, the undepurated clay, the frequency and shape of their holes, and the presence of the internal or external projection, which is not seen in the *ollae perforatae*. They also differ significantly from the small perforated vase discovered in a late Etruscan tomb from Papena (Siena), probably used as a wine sieve, or *colum* (Phillips 1967, 36, 38, figs. 5.19 and 7.41). Although the receptacle is made from granular, undepurated clay and displays holes of a regular alignment and circular appearance, its extremely small size (6.5 cm high with a diameter of 7 cm at the bottom and 11.9 cm at the rim) and its apertures, combined with the lack of internal structure, makes the correlation between these two kinds of vase unlikely. We can also exclude the possibility that the fragments are from a *labrum*.⁵ Some examples of these agricultural containers, made for storing foodstuffs, may have also been used for refining liquids, as is shown by the container from Stabiae (Anecchino 1982, 765–766, fig. 11); however, these types of vase have a limited number of holes (two), which are restricted to the lower part of the wall, and they do not have any internal or external projections.

However, the morphological features of the San Gimignano sherds are consistent with those of *vivaria in doliis* (Fig. 15.3), jars used to fatten dormice. These vases are usually relatively large and are made from *opus doliare*. They are generally characterised by numerous small holes made in the wall, by an inner structure shaped into channels



Figure 15.1. Location of the Elsa Valley, part of the *ager Volaterranus* and the Augustan Regio VII. Vectorisation L. G. Meulemans.

(*semitae*) and by external openings connected to internal cups. The morphology of the preserved sherds from San Gimignano matches these specific features perfectly, suggesting they belong to this class. The shape and the function of such a vase is well described in an extract from Varro's prose:

Hae saginantur in doliis, quae etiam in uillis habent multi, quae figuli faciunt multo aliter atque alia, quod in lateribus eorum semitas faciunt et cauum, ubi cibum constituent. In hoc dolium addunt glandem aut nuces iuglandes aut castaneam. Quibus in tenebris cum operculum inpositum est in doliis, fiunt pingues. (Varro, *On Farming*, 3.15.2)

The presence of these unusual archaeological remains in the Elsa Valley, so far discovered in relatively low numbers,⁶ leads us to question their significance in the rural context of inner Etruria, with regard to the potential social, cultural and economic implications for the activities and practices of the local residents.

Vivarium in doliis: a cultural marker

It may come as a surprise that the fat dormouse (*Myoxus glis* L.) and/or the garden dormouse (*Eliomys quercinus* L.) used to be eaten, as this type of ceramic indicates. These

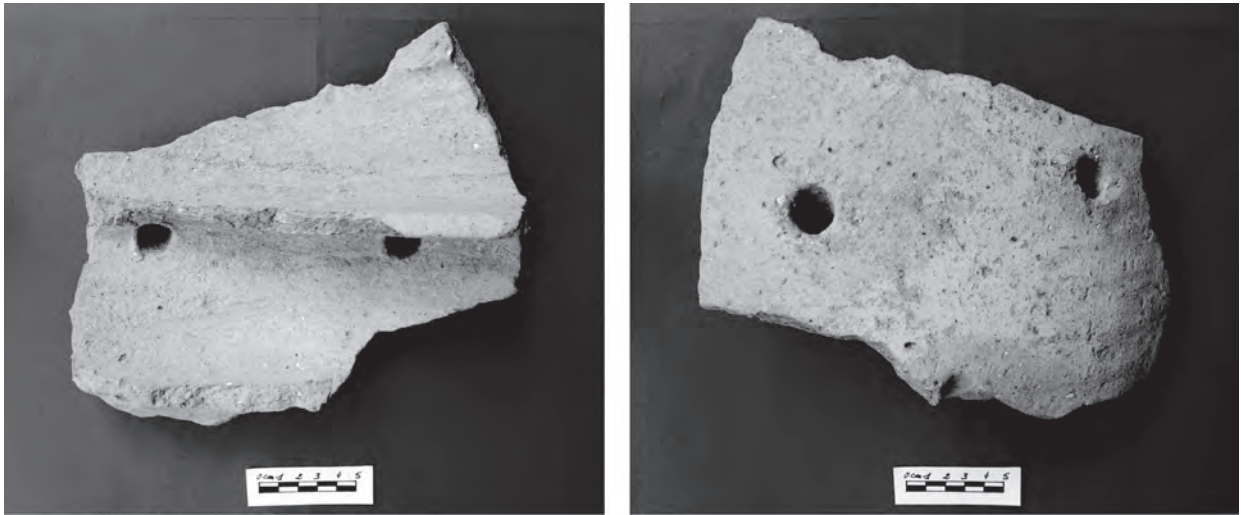


Figure 15.2. One of the *vivarium in doliis* sherds unearthed in the commune of San Gimignano. Photo L. G. Meulemans.

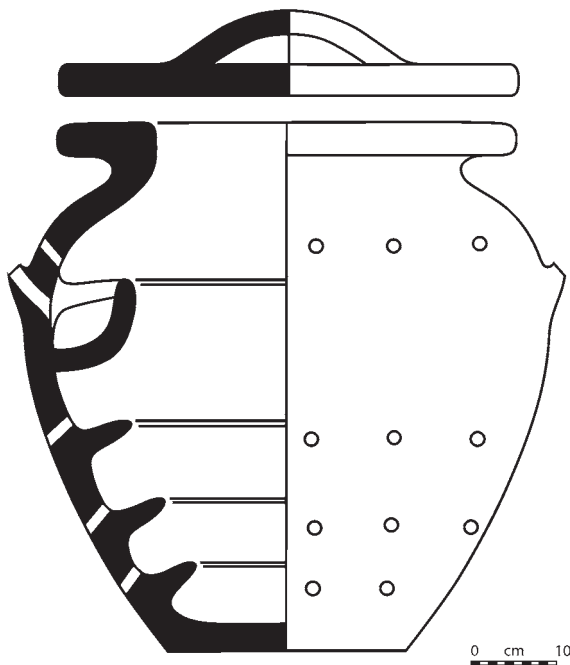


Figure 15.3. An "ideotype" of *vivarium in doliis*. Design L. G. Meulemans.

small animals belonging to the order of rodents (order *Rodentia*, family *Gliridae*)⁷ (Fig. 15.4) are often regarded as pest species and do not, *a priori*, seem particularly suitable as human food. Nevertheless, their consumption is a well-documented practice in the Roman world.

The numerous allusions to the dormouse in Latin literature demonstrate that the Romans were clearly interested in this animal from the Roman Republic to Late

Antiquity. Some excerpts offer information concerning the rodents' way of life, including aspects related to their diet, hibernation or geographical distribution (Plin. *HN* 8.225, 16.18; Martial, *Epigrams* 13.59). Other texts tell us that medicinal properties were attributed to the animal (Plin. *HN* 29.118, 29.135, 30.79 and 30.86). Furthermore, literary sources specify that dormouse was a much-appreciated dish, cooked and served using exquisite recipes (Petronius, *Satyricon* 31.10; Apicius, *The Art of Cooking* 8. 9). They also testify to the practice of the fattening of dormice (Plautus, *apud Nonius*, 119.25; Naevius, *fr. com.* 65; Naevius, *apud Nonius*, 2.633) and the development of techniques for breeding them in enclosures (*gliraria*) or in jars (*vivaria in doliis*) (Varro, *On Farming* 3.15; Plin. *HN* 8.224); the latter is confirmed by the discovery of this type of container on some Roman sites. Latin literature and archaeological finds related to the animal indicate the attention paid to this rodent in Roman society.

Dormouse consumption in pre-Roman Italy is quite a complex topic. Owing to the lack of written sources from these periods, palaeobotanical and archaeozoological remains are the main clues to understanding the dietary habits of prehistoric and protohistoric communities in the Italian peninsula. The preservation of such vestiges is, however, problematic, especially for small animals whose thin bones are highly degradable.⁸ In addition, the presence of dormouse bones on a site, even in association with a human settlement, does not necessarily imply the animal's consumption by humans: it might have been brought and/or consumed by another predator, or might have made its own way onto the site. Indeed, dormice voluntarily enter caves in search of a protected place to hibernate, or venture into villages to find food and shelter.



Figure 15.4. Edible dormouse (*Myoxus glis* L.) and garden dormouse (*Eliomys Quercinus* L.), small rodents of the family *Gliridae*. Illustration by Gustav Mützel. After A. E. Brehm, *Brehm's Thierleben. Allgemeine Kunde des Thierreichs*, Vol. 1.2. *Säugethiere*, 307. 2nd edn Leipzig, Verlag des Bibliographischen Instituts.

A dormouse bone exhumed at the S. Imbenia di Alghero site (Sardinia), however, points quite explicitly to the consumption of the animal on a site occupied during the Iron Age.⁹ The charred proximal epiphysis of this femur cannot easily be explained outside the context of diet. Note, nonetheless, that this bone is the only one from a dormouse in some 4,760 faunal remains discovered at the site; this unique find hardly allows us to confirm that dormouse consumption was a regular practice. The few other sites providing dormouse remains offer no real clue in favour of the consumption of this rodent. They are seen in minute quantities in the settlements at Santo Stefano (L'Aquila province, Abruzzo; Radi and Wilkens 1989) and Ripoli (Teramo province, Abruzzo; Cremonesi 1965, 153) as well as in caves such as that of Sorgenti della Nova (Viterbo province, Lazio; Caloi and Palombo 1981) where the animal could possibly have migrated for hibernation.¹⁰ Although remains of bones have been identified in a few ancient settlements, the rodent does not, *a priori*, seem to have been a regular source of food during the prehistoric and historical periods: its presence in sites colonised by humans is more likely to be related to the synanthropic¹¹ nature of the species. Even though occasional consumption of dormouse cannot be excluded, no evidence for any dormouse farming or breeding equipment for this purpose has been discovered so far for these earlier periods.

Furthermore, the presence of the dormouse in a region does not necessarily lead to its regular consumption by humans. This animal does not constitute a food source in all the regions it inhabits, perhaps as a result of the local conditions, which may not always be conducive to good meat characteristics,¹² but also because its use presumably depends on local practices, tastes and cultural habits. Although the dormouse was widespread in Greece, the ancient inhabitants of the region do not seem to have shown much interest in this rodent.¹³ Aristotle, for example, reported the fattening process occurring in relation to hibernation, but did not place any emphasis on dormouse meat at this season of the year (Aristotle, *History of Animals*, 8.17).

The development of this culinary custom is much more marked in Roman times. In fact, this ingredient seems to have been used widely in cookery during this period (Fig. 15.5). Texts indicate that dormouse husbandry was practised at Ostia (Varro, *On Farming*, 3.2.7 and 3.2.13–14) and Tarquinia (Plin. *HN* 8. 211, 8.224; Varro, *On Farming* 3.12.1), but also in Transalpine Gaul (Varro, *On Farming* 3.12.2). *Vivaria in doliis* sherds show that dormouse rearing and consumption were particularly popular in Campania, Lazio, Tuscany and Slovenia (Colonnelli *et al.* 2000, 321), while faunal remains discovered in York (O'Connor 1986) suggest that the practice had also spread to Great

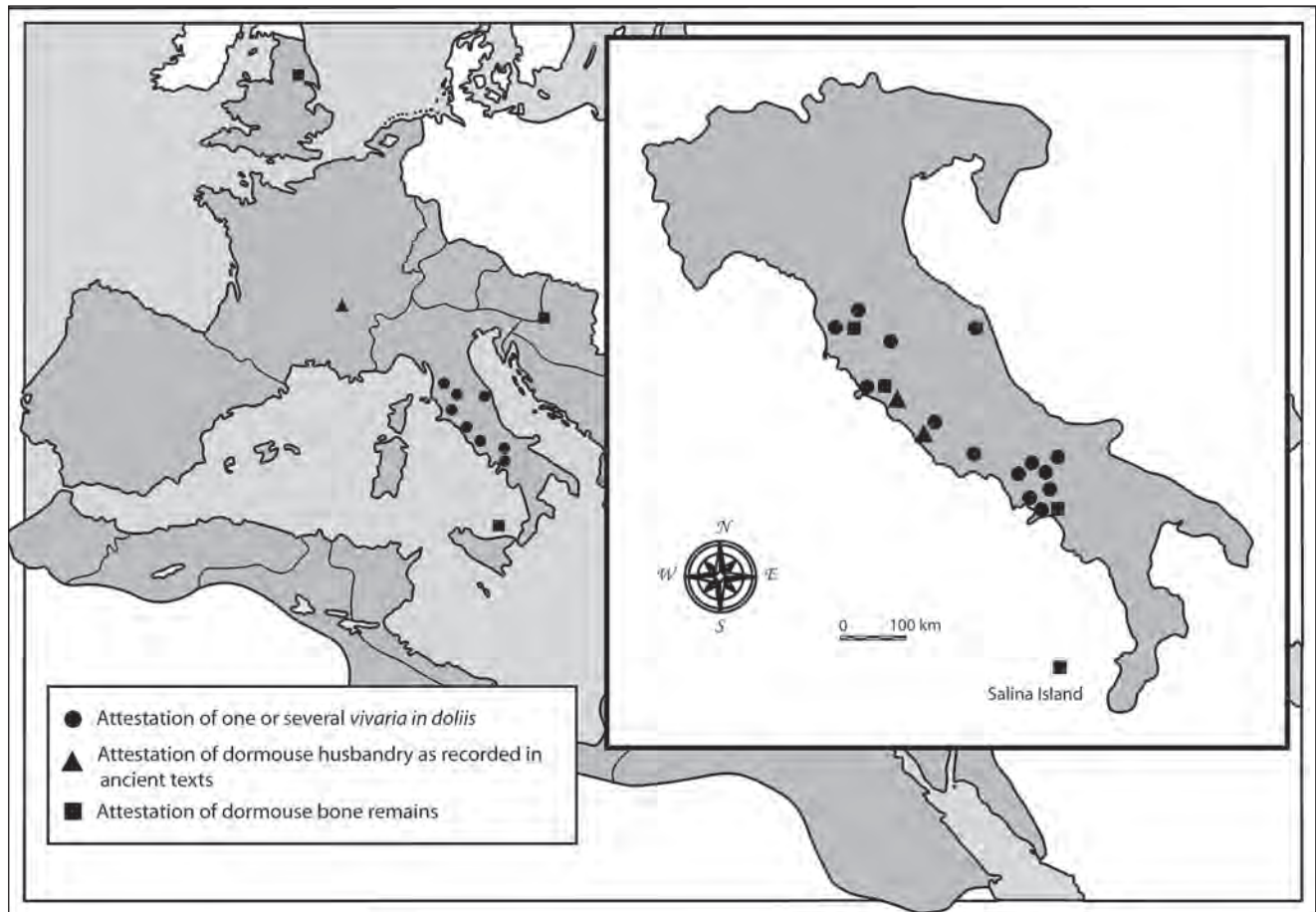


Figure 15.5. Distribution map of dormouse consumption during the Roman Empire. Vectorisation L. G. Meulemans.

Britain. Furthermore, it seems that during this period the dormouse was deliberately introduced to new territories under Roman influence, including several Mediterranean islands (Colonnelli *et al.* 2000, 316; Carpaneto and Cristaldi 1995, 306) and some regions located in the northern part of the empire (O'Connor 1986, 621–622). Consequently, the widespread consumption of dormouse suggests that the use of the animal was such a common practice in the Romans' culinary art that it followed them during their migration to and settlement in new provinces.

In Roman times, elaborate techniques were also developed to enable dormouse consumption all year round. As it is understood today, the Romans seem to have been the inventors not only of *gliraria* (outdoor enclosures for keeping the animals in captivity and ensuring their reproduction), but also of *vivaria in doliis*, jars used to facilitate their fattening before consumption. These techniques illustrate how the dormouse was a commodity prized by Roman gourmets, who were eager to acquire the animal, independently of the unpredictability of hunting and of the fattening process that occurs in nature

only seasonally, prior to hibernation. The very specific functional features of the *vivarium in doliis* highlight the great attention paid to dormouse farming in Roman society. Designed to meet a particular need, this type of ceramic represents the culmination of a research process intended to fulfil the requirements of their unusual husbandry.

The widespread consumption and breeding of the dormouse during Roman times, combined with the apparent lack of such practices before this period, suggests the important role played by this rodent in Roman culture. Moreover, the animal has traditionally been depicted as a dish of Roman origin¹⁴ and its consumption seems to have outlasted the fall of the empire,¹⁵ persisting until recently in areas which were formerly Romanised, including Italy, Spain and Central Europe.¹⁶ Clearly, dishes based on dormouse were deeply engrained in society and played an important role in Roman culinary identity. As a reflection of a typical Roman custom, *vivarium in doliis* could be regarded as a cultural indicator of the Roman character of the societies in which they were used.

Vivarium in doliis: a social marker

Several signs suggest that dormouse consumption was reserved for the affluent classes. During the Roman Age, meat was mostly regarded as a prestige food (Prina Ricotti 1987, 88; Garnsey 1999, 123–127). Furthermore, ancient texts indicate that Romans considered dormouse to be a much-desired delicacy, displayed on the wealthiest tables. It is one of the dishes served during the sumptuous banquet offered by Trimalchio to his guests in the *Satyricon* (Petronius, *Satyricon* 31.10) and was served to the guests of the opulent dinners described by Ammianus Marcellinus (*History* 29.4.13).

This food seems to have represented luxury, so much so that it was banned by a sumptuary law from the tables of the rich patricians. From the 2nd century BC, a range of laws and decrees were passed to restrict excesses of luxury in private life.¹⁷ These ordinances were intended to discourage the excessive sumptuousness that had overtaken the wealthiest tables of the time, in order to avoid social upheaval (cf. Goody 1982, 103 and 112–114). They concentrated both on regulating the number of guests and on limiting the expenditure allowed in the organisation of banquets. They also condemned the overabundance of foodstuffs and the over-consumption of sophisticated and exotic meat such as birds, pheasants, peacocks, dormice, etc. The generic name (*leges sumptuariae*) used to designate those laws highlights the fact that the dormouse, like other forbidden foods mentioned in these decrees, was the preserve of the affluent classes. The presence of this rodent amongst the prohibited meats (Plin. *HN* 8.223, 36.2) points to the popularity of this dish in Roman high society. Indeed, if the dormouse had only rarely been consumed, it would most likely not have been forbidden explicitly in any of these laws. In any event, the decree does not seem to have succeeded in stemming dormouse consumption: as demonstrated by Ammianus Marcellinus (*History* 29.4.13), this dish continued to be an important part of the most refined banquets of the 4th century AD.

The production methods used to create the main ingredient for the dish also reflect its economic value. Techniques used by the Romans to rear dormice were in fact an integral part of the *pastio villatica* (captive husbandry of wild animals) practised by the wealthy owners of *villae rusticae*.¹⁸ Varro's comments suggest that the *pastio villatica* provided an important source of income: carefully managed, it could yield substantial profits (Varro, *On Farming* 3.2.13–14, 3.2.17 and 3.16.10–11). Game, fish, birds and honey became essential for aristocratic tables; the wealthiest households competed to show this kind of conspicuous consumption, which clearly set the elite apart from the lower levels of society.¹⁹ Delicacies produced within the *pastio villatica* were highly prized

for private banquets and their economic value must have been considerable. Thus, dormouse husbandry was most probably developed to satisfy the culinary requirements of the highest social class, the only class privileged enough to be able to buy or produce this expensive delicacy.

In modern times, the social classes that consume the dormouse are sometimes very different, even diametrically opposed from an economic point of view. Despite being an expensive foodstuff that only the wealthiest can afford to buy from the market,²⁰ in some areas the animal is also eaten by farmers and their families.²¹ Therefore, dormouse consumption does not necessarily have to be the exclusive preserve of the elite: while only the affluent classes are able to afford to pay for this meal, farmers can enjoy the fruits of their own hunting. Nevertheless, it is extremely difficult to determine whether the lower classes were able to enjoy dormouse meat in ancient times. Even though the number of documents concerning this section of the population is very limited, rare literary and archaeological finds suggest that farmers or members of the rural middle class might also have been involved in dormouse hunting or rearing.

One of Martial's *Epigrams* is relevant here. Praising the plain and laborious lifestyle characterising the country houses of Baiae, this poem reports that peasants used to greet their *patronus* by offering him country products, including dormice:

Nec uenit inanis rusticus saluator:
Fert ille ceris cana cum suis mella
Metamque lactis Sassinate de silua;
Somniculosos ille porrigit glires,
Hic uagientem matris hispidae fetum,
Alius coactos non amare capones;
Et dona matrum uimine offerunt textu
Grandes proborum uirgines colonorum.

(Martial, *Epigrams* 3.58)

As well as confirming the taste for dormouse meat in Roman antiquity, this excerpt from Martial might suggest that even though dormouse hunting might have been practised by peasants, the animal was apparently considered as a high-status product, even in the countryside where it was offered as a gift to members of higher social classes. However, there is no evidence that these farmers would never have consumed at least some of their catch themselves.

In *ager Volaterranus*, at Podere San Mario (in the area of Pomarance in the Cecina valley), not too far from San Gimignano, the discovery of numerous fragments of *vivaria in doliis* indicates that the dormouse was raised in a small rural farm, which probably belonged to middle class farmers and apparently was in use from the 4th century BC to the 5th century AD (Camin 2005, 7–8, 13). According to osteological data, this farmstead focused its resources on sheep, cattle and pigs, and on hunting and gathering forest

products, as well as on the growth of starchy vegetables, cereals and grapes (Camin 2005, 13; Motta, Camin and Terrenato 1993, 113–114). The low number of dormouse bones found during the excavation suggests that the animal was not consumed in situ, unlike cows, pigs and goats, whose numerous remains demonstrate their role in the diet of the inhabitants (Camin 2005, n. 28). Presumably practised as a side activity, dormouse husbandry could thus have been a cash crop for sale to local aristocrats rather than for personal consumption.

Thus in ancient times the consumption of the dormouse seems largely to have been limited to the wealthiest members of the population. The little evidence that is available on the hunting or farming of the dormouse by peasants or members of the social middle class suggests that the animals they farmed or caught were mainly destined for the tables of an upper social class. However, the possibility that these individuals enjoyed at least sporadic access to dormouse consumption cannot be ruled out.

Conclusion

The presence of *vivaria in doliis* sherds in the commune of San Gimignano provides interesting clues regarding both the socio-cultural context of the sites and the nature of their structures.

Firstly, the *vivaria in doliis* from San Gimignano have implications as indicators of Roman influence. Due to their specific features, these containers are clearly a reflection of a typical Roman custom, and thereby reveal the political, administrative and/or cultural impact of Rome on the territory. These jars could have appeared in the region at the instigation of colonists eager to settle surrounded by their own cultural practices. They would be witnesses of the political and administrative presence of Rome in the territory. These vases may have also been used by the local elite and would then suggest the adoption of Roman eating customs in the area. According to textual and archaeological sources, this type of ceramic seems to have been in use at least from the late 2nd century BC to the end of the 2nd century AD. A precise dating of the San Gimignano sherds is unfortunately not possible, because of the inherent characteristics of this type of ceramic²² and also because of the circumstances of their discovery.²³ Dating information would nonetheless have been helpful in determining whether these jars correspond to the beginnings of the Roman infiltration in the area or to a period of full *romanitas*. At any rate, the presence of these fragments indicates the occupation of several sites in the area during Roman times, apparently accompanied by the adoption of Roman culinary customs on the part of local inhabitants, or the introduction of such customs by

colonists. These ceramics therefore provide an interesting perspective for the study of a territory whose level of occupation in Roman times is controversial.²⁴

The *vivaria in doliis* from San Gimignano also give an indication of the types of settlement present in the territory. Jars used for dormouse fattening generally form part of the *pastio villatica*, an activity practised in the *villae rusticae*. This kind of villa would then, *a priori*, be the favoured place for the use of these vessels. Nevertheless, a similar container was discovered in a small rural farm located in the *ager Volaterranus*, at Podere San Mario. The cultural and geographical proximity of the two sites might suggest that the *vivaria in doliis* unearthed in the vicinity of San Gimignano signal the presence of similar small farmsteads. Despite the limited number of villas currently identified in northern inner Etruria, the potential existence of such a structure in the territory of San Gimignano cannot be excluded.²⁵ Soundings or excavations will be needed to determine the type of structures buried at these locations. Such investigations would be of considerable interest to improve the knowledge of this class of ceramic and of the settlement patterns in the Elsa Valley. In any case, the *vivaria in doliis* from San Gimignano testify to the presence of a farm of unknown size, whose purpose might have been in part to produce goods for sale: as in the case of the *pastio villatica*, the small-scale production developed in Podere San Mario was probably also a for-profit activity.

Finally, the *vivaria in doliis* from San Gimignano provide clues regarding the social status of the inhabitants of the Elsa Valley. Given that dormouse husbandry was developed to satisfy the culinary tastes of the privileged class, jars used for this breeding activity represent a social marker, testifying to the presence of aristocrats in the area. If these containers were used in a *villa rustica*, they could reveal the existence of an upper social class in the territory of San Gimignano. The use of these vases in small farmsteads could, in turn, indicate the presence in this area of *clientes* or independent landowners belonging to the social middle class, as well as the settlement nearby, perhaps in one of the neighbouring cities, of a local aristocracy for whom they produced or on whom they depended.

This collection of data demonstrates the potential of this type of ceramic. As a cultural indicator, it gives many insights into the society that used it. The systematic publication of unpublished sherds from *vivaria in doliis* and the study of objects stored for decades in museums are fundamental in order to improve our knowledge of these items and to give a comprehensive overview of their uses and distribution. This utopian wish does not spring from the mere desire to collect data in order to classify them into rigid typologies, but aims to bring us much closer to Roman civilisation, revealing unexpected cultural aspects that are unattainable through other materials.

Notes

- 1 The aim of the international project “VII Regio. The Elsa Valley during the Roman Age and Late Antiquity” is to establish a diachronic overview (3th century BC–early 8th century AD) of the upper Elsa Valley territory, in order to reconstruct the settlement patterns over those centuries and to understand the acculturation processes involved in the area and their impact on society. See Cavalieri 2009.
- 2 We would like to thank the Soprintendenza per i Beni Archeologici della Toscana for allowing us the study of this material.
- 3 About the *ollae perforatae*, see Consalvi 2008, 101, fig. 96; Messineo 1985, 152, fig. 128; Anecchino 1982, 760–762, fig. 8.
- 4 Layering is a plant propagation technique. Regarding the use of ceramic pots for this purpose, see Cato, *On Agriculture* 52, 133 and Plin. *HN* 17.97–98.
- 5 For more information on the *labrum*, see Columella, 12.52.10–11 and Anecchino 1982, 765–766.
- 6 See the inventories of this ceramic type compiled by Carpaneto and Cristaldi 1994, 330; Colonnelli *et al.* 2000, 320–324.
- 7 Regarding the *Gliridae* species eaten during Roman times, see Colonnelli *et al.* 2000, 315–316; Carpaneto and Cristaldi 1994, 312; O'Connor 1986, 620, 622.
- 8 For methodological aspects related to the archaeozoological approach, see *e.g.* Gejvall 1967, 266–267 and Östenberg 1967, 154.
- 9 For the publication of this bone and the faunal assemblage from S. Imbenia di Alghero, see Manconi 2000, 273.
- 10 The presence of dormouse bones, apparently related to the hibernating habit of the species, is also reported in caves from other geographical areas. Cf. Jeannet and Vital 2009, 148.
- 11 In zoology, synanthropism is a particular type of commensalism directed towards man.
- 12 The lack of hibernation seems to be a contributing reason for the non-consumption of the dormouse in Africa. See Carpaneto and Cristaldi 1994, 316–317.
- 13 No evidence of dormouse consumption has so far been found in ancient Greece, and Castore Durante (16th century) explains that the dormouse was not eaten by Greeks, in contrast to its popularity with the Romans (see Colonnelli 2007, 73).
- 14 For example, Ortensio Lando (16th century) explains that “*Petronio Galeso fu il primo uomo che mangiasse mai ghiri, sonvi però alcuni che attribuiscono cotesta invenzione a Quinto Scauro*” (Lando 1553, 121).
- 15 Concerning the culinary use of dormouse during the Middle Ages and the modern era, see Colonnelli 2007, 69–73.
- 16 Carpaneto and Cristaldi 1994, 313–317; Colonnelli 2007, 73–75.
- 17 For the main ancient texts discussing the content of the sumptuary laws, see Aulus Gellius, *Attic Nights*, 2.24 and Macrobius, *Saturnalia*, 3.17. For a comprehensive study of these decrees, see Savio 1940.
- 18 For more information about the *pastio villatica*, see Varro, *On Farming*, Book 3.
- 19 Concerning the role played by food in the stratification of society and the kind of dishes often characterising elite food, see Goody 1982.
- 20 In Lazio, for example. See Colonnelli 2007, 74.
- 21 In particular in Sardinia (Carpaneto and Cristaldi 1994) and in Spain (Carpaneto and Cristaldi 1994, 315; Colonnelli 2007, 73).
- 22 Functional and not highly standardised, these ceramic objects respond to utilitarian rather than aesthetic considerations. It therefore seems *a priori* difficult to establish a precise chronological sequence based, for example, on the evolution of their section or rim.
- 23 These sherds were collected during prospecting surveys. Any context and stratigraphic relationship is thus definitively lost.
- 24 Concerning the controversy on the decline of the Elsa Valley territory during the Roman times, and its possible abandonment during this period, see Cavalieri 2009, 5–6.
- 25 Villas are, for example, attested in the Elsa Valley, at Urbana (Chellini 1993, 113–114) and Colle di Val d'Elsa (Cavalieri 2009, 15), as well as in the neighbouring region, at Vergigno (Berti 2007, 640–641).

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New pots, new recipes?
Changing tastes, culinary identities
and cross-cultural encounters

THE ATHENIAN KITCHEN FROM THE EARLY IRON AGE TO THE HELLENISTIC PERIOD

Susan I. Rotroff

Most recent progress in the study of cooking pottery has taken advantage of the ability to look ever more closely at the objects: with hand lens, petrographic microscope, through neutron activation, X-ray fluorescence, and the like. Such studies are of necessity focused on a limited body of pottery, usually within a closely defined chronological range. In this paper, I take the opposite approach, looking at the pottery from a distance, as it were, in order to consider its development over a long sweep of time.

The Agora Excavations provide abundant evidence for such a project. The history of human habitation on the site extends from the Neolithic period to the present. The excavations have been active since 1931, and though cooking ware was hardly a priority, examples were recovered from the very beginning.¹ More than 1,000 cooking pots have since accumulated in the excavation inventory, most from deposits datable within fairly narrow limits. For my inquiry, I have chosen the period that we may broadly label “Greek”, stretching from the beginning of the Iron Age to the end of the 1st millennium BC. The cooking pottery of this time span constitutes a coherent group in that it demonstrates a strong current of continuity, and it remains largely untouched by the dramatic changes in the ceramic repertoire brought about by the Roman conquest. Furthermore, the basic typological and chronological groundwork for the pottery of this millennium has already been carried out in a series of synthetic studies in the Agora series, providing rich data for the general review below.²

Methodology

This overview is based primarily on 450 cooking vessels

dating between c. 1050 BC and the end of the 1st millennium BC. For practical reasons, I have narrowed my inquiry to inventoried objects, which represent only a sample of the cooking ware originally excavated. There is no account of the reasons why 80 years of Agora excavators selected specific vessels for inventory. It is likely, however, that they chose the most complete vessels, samples of the most characteristic vessels, single unusual vessels or fragments, and those vessels or fragments that were thought to be important for the dating of the deposit in question. Fragments and duplicates of shapes that occurred in many iterations would have been consigned to the category of “context pottery” and stored in numbered tins or boxes for future reference. An unknown percentage was also discarded because of the limitations of storage space. The inventoried pottery thus functions as an index to the rest of the collection, but it does not mirror it precisely.³ It is also the case that the number and size of deposits excavated varies from period to period, so one cannot assume uniform coverage of the entire thousand-year span under consideration.⁴ The inventoried collection can be used to paint the broad strokes of an overview such as I present here, though there is no doubt that a complete examination and quantification of the millions of sherds of the context collection would suggest some adjustments.

Among these inventoried pots, I focus largely on cooking vessels, identified as such by a combination of fabric, form and sooting. I generally leave aside devices designed to support pots over the fire or to enclose them in a heated environment, which would add at least another 150 objects to the discussion.⁵ Most of the vessels were found in wells or cisterns and were probably used in nearby houses.

Although a few Early Iron Age cooking pots come from graves, sooting on their walls shows that funerary use was secondary. We are thus dealing with the vessels that ancient Athenians used for food preparation on a day-to-day basis, or at least at regular intervals. Their chronological distribution is as follows:

Early Iron Age (1050–700 BC):	55 (12%)
Archaic (700–480 BC):	61 (14%)
Classical (480–331 BC):	93 (21%)
Hellenistic (331–1 BC):	241 (53%)

The high number of Hellenistic examples in the sample is no doubt partly due to my familiarity with that period, but may also result from other factors: the length of the period; the more recent date, hence better preservation; the greater diversity of forms, encouraging greater inventory activity; or increased intensity of habitation or of dumping in the area.

The cooking assemblage revealed by this data is essentially a simple one, encompassing two primary forms: a deep and capacious closed pot, at first flat-bottomed and jug-like (commonly termed a cooking jug), later round-bottomed (commonly termed a *chytra*);⁶ and a shallower and more open vessel, the *lopas*. Along with these, a third shape, a wide, shallow and usually flat-bottomed pan, appears with regularity but with significant variations in form and no doubt in function as well. Its forms suggest that it served variously as a baking pan, a griddle, a frying pan, or a portable hearth. It thus falls inconveniently between the categories of vessel and device, but for this study I consider it the former. The *chytra* is the only shape that continues throughout the millennium. It was apparently entirely adequate to the needs of the Athenian cook for the first half of the period. Even after the introduction of other shapes about halfway through the span, the *chytra* outnumbered the others significantly: *chytrai* are nearly twice as numerous as *lopades*, and more than four times as numerous as pans during that span (5th–1st century BC).

Within this structure there are many subtle variations, and more and more of them as time goes on. This paper attempts to draw some broad generalities out of a welter of detail, using the following strategies. I break the millennium into two-century intervals in order to avoid the usual divisions by period, which can obscure continuities and changes. I take as my basic unit the form, defined as a set of characteristic features that occur in multiple examples. One can debate at length whether two somewhat differing pots – like a *chytra* with a plain rim and a *chytra* with a collared rim⁷ – represent variations on a single form or two different forms, making it difficult to tally the number of forms in circulation at any one time. In the definitions and tallies below, I have ignored what I regard as minor variations. I also concentrate on what I term robust

forms, those that are present in many examples and were without a doubt a significant part of production. Forms that are represented in only one or two examples are common (in fact, they outnumber the better populated forms substantially), but they are difficult to interpret. They may be imports, production freaks, or important shapes of which, by chance, we have only one or two examples, but there is no easy way to know which. In the interests of concentrating attention on broad developments within the cooking assemblage, I set them aside here.

Discrimination between local and imported vessels is of course crucial to an understanding of the dynamics of the development of the production and use of cooking pottery at Athens. Most of the distinctions made below are based on macroscopic observation, but they are supported by limited chemical and petrographic analysis.

Results

The simple statistics presented here paint a picture of increasing variety in the Athenian kitchen. Over the millennium, the number of different forms in general use rose from two to 12, in a clear and continuous trend, and the number of exotic rarities available went from one to close to 20. In what follows, I map out the major developments in the kitchen assemblage and offer some conjectures about the human activities that lie behind them.

1050–800 BC

Only two forms were present in any numbers at the beginning of the millennium (Fig. 16.1). Almost all of the cooking vessels of that time are one-handled jugs with flat, flattened, or slightly convex bottoms (e.g. Papadopoulos and Ruscillo 2002, 190, fig. 5 [P 3760, P 3761]). A rim-handled amphora, in essence a large jug with a second handle for easier lifting, occurs in only four examples.⁸ Variation and simplicity of manufacture suggest that these vessels – all hand-made – were constructed in the household, not the workshop, though whether we should style this a household production or a household industry I cannot say; perhaps the detailed study of this material currently under way by Sara Strack will provide the answer.

800–600 BC

The pattern is not very different in the ensuing two centuries, encompassing the remainder of the Geometric and the Protoattic period (Fig. 16.1). The cooking jug continues to dominate, still hand-made, but more uniformly, and probably now produced by professional potters (Brann 1962, 55, pl. 11). The absence of new forms in the early part

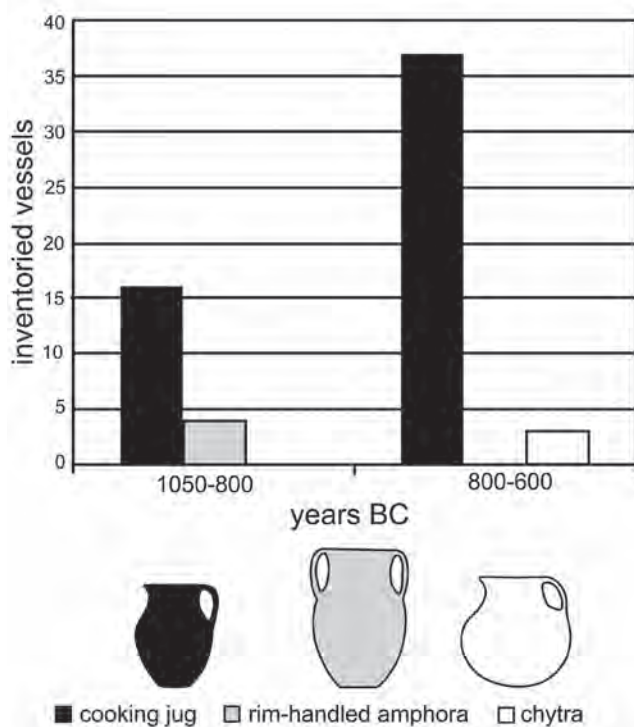


Figure 16.1. Robust forms of the periods 1050–800 and 800–600 BC.

of the 7th century BC suggests that the exciting arrivals from the East documented by developments in fine pottery and other material culture were not accompanied by new menus, exotic foodways, or an influx of easterners, despite the oriental banqueting culture suggested by the 7th-century BC *Opferrinnen* assemblages of the Kerameikos.⁹

There are, however, two remarkable developments in this two-century span. First, a small group of very large cooking jugs, probably limited to the latter part of the 8th century BC, stand out as the most impressive Athenian cooking pots of all time (Fig. 16.2).¹⁰ At over 30 cm in height, they would have been suitable for the preparation of 8 or 9 litres of stew or soup. In addition, they are the only Athenian cooking pots of any period provided with decoration. Incised wavy lines outline the rim and the edges of the handle, and a double line runs from the lower handle attachment around to the belly, which is marked by two nipples. Between them is an incised design, almost always a swastika. Although most of these jugs have been published, they have usually been photographed with the handle at the side (as in Fig. 16.2), so that the decoration opposite it is all but invisible, and it is perhaps for this reason they have received less attention than they deserve. Size associates these prodigious jugs with feasting and perhaps with the rise of an elite class that participated in that activity, or possibly with a group without access to costly metal cooking vessels but that emulated elite activities. It



Figure 16.2. Late Geometric cooking jug with incised decoration (Agora P 24850). Photo S. I. Rotroff.

is intriguing that these vessels appear contemporaneously with the earliest of the *Opferrinnen* at the Kerameikos, and it would be tempting to associate them with the enhanced banqueting that the funerary deposits seemingly witness. Chronology offers no support for that hypothesis, however, for the jugs ceased to be manufactured well before the *Opferrinnen* phenomenon reached its peak in the second half of the 7th century BC. Either modes of food preparation changed as the custom became better established, or the jugs were never associated with that particular type of feasting in the first place.

The meaning of the decoration has been little explored, beyond the startling comment that nipples are “self-explanatory on these kitchen jugs designed to hold nourishment”, and the dismissal of the swastika as “purely ... ornament” (Brann 1961a, 143). Decoration implies display, but the incised panel, always placed on the scorched wall opposite the handle and facing the fire, would have been invisible during food preparation, though it could perhaps have been admired afterwards if the contents were distributed to diners directly from the jug. Alternatively, the pots might have received decoration not for display, but to mark them for a special function, as dowry items, perhaps. A similar swastika occurs on a small *pithos* from the Athens Metro excavations (Parlama and Stampolides 2000, 64, no. 36), and since food storage, like food preparation, may have been within the woman’s purview,¹¹ a *pithos* too might have made up part of a woman’s dowry. A third possibility is that the incised motif was apotropaic, offering protection against the fire; a heat-induced crack would not only end the life of a large and costly pot, but ruin what was obviously intended to be an elaborate meal. Centuries later, the same motive – protection from fire – may lie behind the decoration of

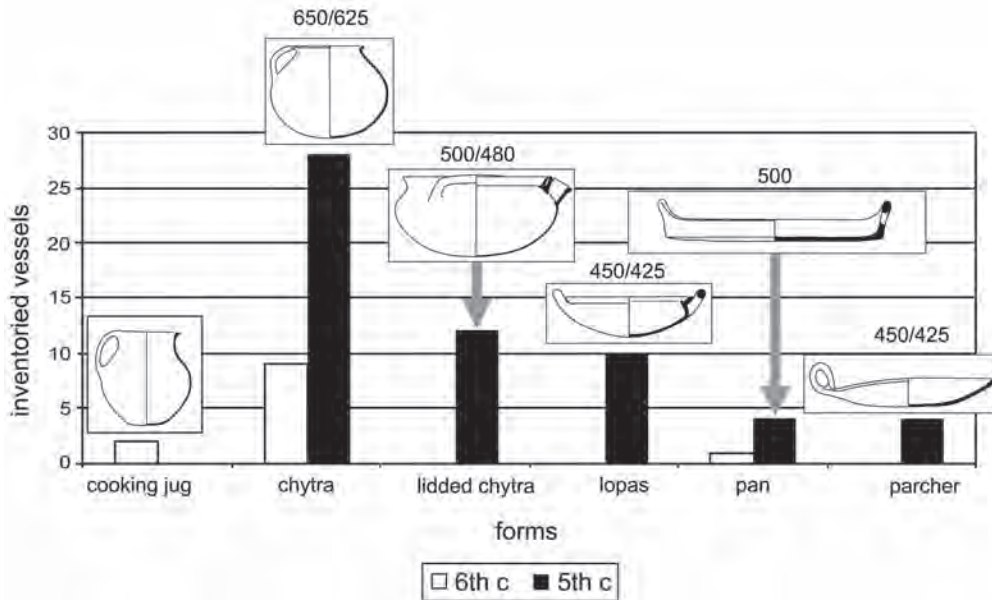


Figure 16.3. Robust forms of the 6th and 5th centuries BC.

Hellenistic braziers, where the faces of satyrs and fire demons confront the fire on which a pot simmered.¹²

A second and more lastingly significant event of this two-century span is the appearance of a new shape: the globular, round-bottomed *chytra*, present in three examples. The earliest full-sized one, from a Middle Geometric well, stands by itself in the 8th century BC, a local oddity or conceivably a unique import.¹³ The next two date over a century later, and both are imports from Aegina.¹⁴ They constitute the start of a trickle that within another century would become a flood.

600–400 BC

In the course of the next two-century slice, variety becomes much greater, although the simplicity of earlier centuries persists through most of the 6th century BC (Fig. 16.3). The *chytra* now dominates, with one or two cooking jugs representing the end of the Iron Age tradition.¹⁵ The change from jug to *chytra* represents the most dramatic innovation in the course of the millennium.¹⁶ It involves switching from a deep pot that sat beside the fire, not on top of it, to a round one that had to be supported above the fire or nestled into the coals. Although the round shape offers improved thermal qualities (Rice 1987, 241–242), its lack of stability presents obvious challenges, and Athenian cooks must have had to develop different techniques for handling their pots. As the driving force behind such a change, one would be tempted to speculate about changes in food preparation, or the introduction of new recipes, or

the influence of new people on the kitchen assemblage. The recent work of Gudrun Klebinder-Gauss on Aeginetan pottery, however, has rendered such speculation moot.¹⁷ Despite the 8th-century forerunner mentioned above, it is now clear that the Athenians owed the round-bottomed *chytra* to Aeginetan potters and traders. Along with other innovations from the island, it virtually replaced local cooking pots in the late 6th and 5th centuries BC (see Gauss *et al.* this volume, especially nn. 18, 20, 23, 24, 33 and figs. 6.7–6.8).

The earliest inventoried Aeginetan vessel at the Agora is a *chytra* from a well of the third quarter of the 7th century BC.¹⁸ Only three more Aeginetan *chytrai* have been inventoried from deposits laid down within the next 100 years.¹⁹ This might suggest only sporadic imports until about 525 BC, but there are reasons for believing that this is not the case. The fact that the cooking jug had all but disappeared by the early 6th century BC must mean that its place had been already been taken by the imported *chytra*. The small number of inventoried examples may be the result of the relatively sparse deposit record for the 6th century BC, especially its earlier three quarters.²⁰ In addition, much Aeginetan ware may lie unnoticed among uninventoried pottery. In any event, there is no doubt that Aeginetan imports had flooded the Athenian market by the time of the Persian invasion, for they account for over 70% of the inventoried cooking pots discarded between c. 525 and 480 BC, while Attic ones make up less than 20%.²¹ Since Attic fine ware was as dominant on Aegina as Aeginetan cooking ware was in Athens, one might imagine a system

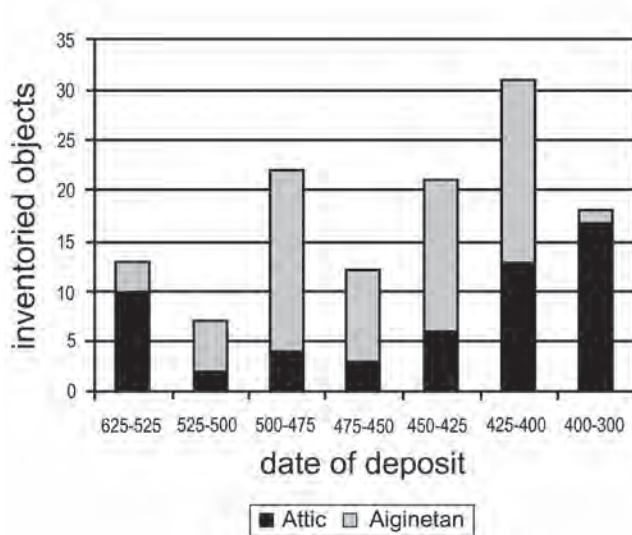


Figure 16.4. Comparison of the number of inventoried Aeginetan imports vs. Attic products (both cooking vessels and devices) in Agora deposits, 625–300 BC.

of even exchange. But the network was probably more extensive. If the famous merchant Sostratos of Aegina is the same as the “SO” of many trade marks on Attic pottery exported to Etruria at this time (Johnston 1972), perhaps his ships and others like them brought Aeginetan cooking wares to Athens, exchanged some of them for Attic pottery, and sailed on westward. Quite a bit of Aeginetan cooking pottery has been found in the west,²² though not to my knowledge in Etruria. The apparent absence of Aeginetan pottery there has been explained in the past by the contention that “the Aeginetans made no fine pottery for export” (Harvey 1976, 212). But we now know that Aegina did have fine pottery to export, just not fine *table ware*, and perhaps hitherto overlooked examples of it have turned up on sites where SO trademarks have come to light.

Among the rich cargo of imports arriving in Athens were other new shapes. The first inventoried instance of a pan/griddle/hearth comes from a well filled at the end of the 6th century BC,²³ and the lidded, two-handled *chytra* first occurs just slightly later.²⁴ The latter would continue to be basic to the Athenian repertoire until the end of the millennium. Another mainstay of the later assemblage, the *lopas*,²⁵ was added in the third quarter of the 5th century BC, along with a shallow lens-like vessel probably used to parch barley and legumes and which had a much more limited lifespan.²⁶

A glance at Fig. 16.4 (which tallies both vessels and cooking devices) shows the volume of Aeginetan imports and the correspondingly limited extent of Attic production, virtually all of which is imitative of the Aeginetan forms. One might have expected Aeginetan imports to disappear

from Agora deposits after 456 BC, when Athens inflicted a devastating defeat on the island; and surely imports must have come to a halt in 431 BC, when the Athenians forcibly removed the population and installed a *klerouchy* on Aegina. But the Agora data show growing numbers of Aeginetan imports all the way to the end of the 5th century, and the expected crash does not materialise until the 4th century BC. To my knowledge, only one object of unquestionably Aeginetan fabric occurs in a deposit laid down in the 4th century BC: a square brazier discarded around 390 BC, probably after a considerable use life.²⁷ Absent the historical record, the Agora deposits would suggest that imports continued until the end of the 5th century BC. To the contrary, however, this combination of historical and archaeological facts may constitute a rare demonstration of the lag time between historical events and the archaeological record.

The Agora does, however, provide two pieces of indirect evidence for the earlier curtailment of Aeginetan imports, the first in the form of lead-clamp repairs. Such repairs are rare among cooking pottery. Of the 12 (of all periods) that I have identified at the Agora, the two earliest were applied to Aeginetan imports. A lead plug fills the hole left by the breakage of a spout on a *lopas* discarded before c. 425 BC.²⁸ Multiple clamps repaired more serious damage to a brazier found in a deposit of the last quarter of the century.²⁹ These incidents hint at the unavailability of replacements, something we would not guess from the chronological distribution of Aeginetan pottery in the deposits.

A second hint comes from the nature and timing of Attic imitations of these imports. Athenian potters began to produce their own version of the round-bottomed *chytra* at least as early as the middle of the 6th century BC.³⁰ Despite their clear intent to replicate the Aeginetan shape, their products betray their Attic origin in more than just fabric (Fig. 16.5). The Aeginetan *chytra* (Fig. 16.5 left; cf. Gauss *et al.* this volume figs. 6.6, 6.9 and 6.10) is very symmetrical, produced at least partially on the wheel, and smoothed and burnished in distinctive patterns inside and out, while the Attic vessel (Fig. 16.5 right) is hand-made and subtly irregular, its surface is not burnished, and its rim is folded in and flattened on top instead of wheel-tooled to a plain edge. While the Aeginetan shape is truly globular, a slight flattening of the bottom of the Attic imitation preserves the memory of the old cooking jug, as does the finger indentation at the lower handle attachment, which is common on Attic cooking jugs. In other words, the imitations were clearly made by potters steeped in a different tradition, which they did not give up easily.

The case of the *lopas*, however, is quite different. It must have been imitated very shortly after the first imports arrived, for an Attic example has been found together with imports in one of the earliest contexts in which the

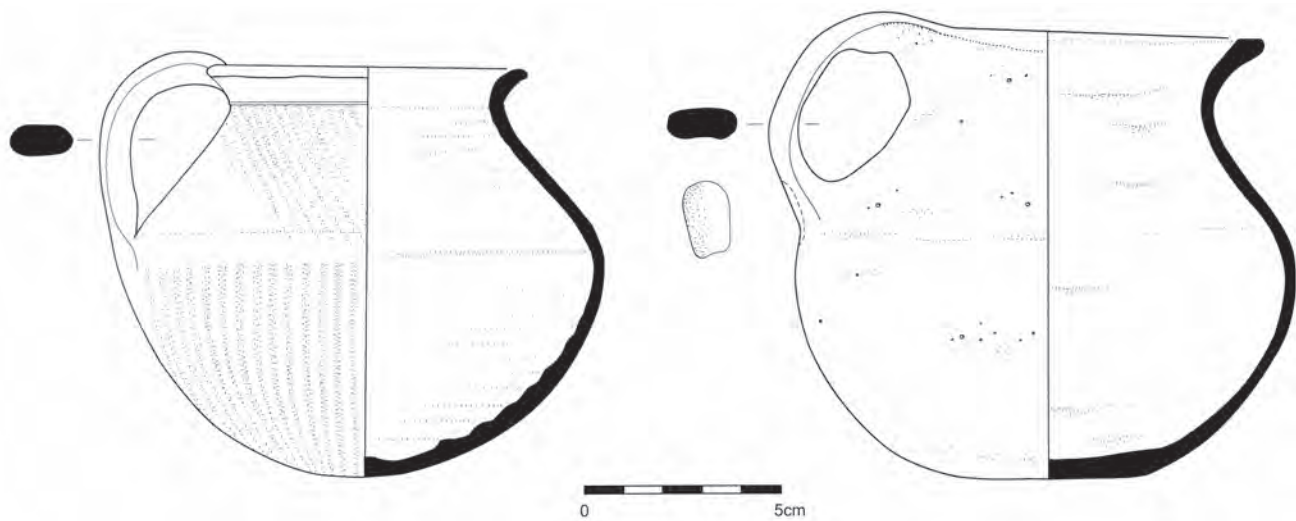


Figure 16.5. Aeginetan *chytra* (left) and Athenian copy (right) (Agora P 23188, P 23198). Drawing Anne Hooton.

shape appears.³¹ This Attic *lopas* is distinguishable from the imports only through close scrutiny of the fabric; in all other details of shape, technique of manufacture, and finishing it replicates its model slavishly. This same degree of astonishingly precise replication of Aeginetan models in Attic fabric has been noted by Klebinder-Gauss and Strack in the reviving Attic industry of the 4th century BC, and they interpret it convincingly as evidence of Aeginetan potters now working on the Attic mainland, having migrated to Athens most likely in connection with the events surrounding the expulsion of Aegina's population by the Athenians in 431 BC.³² If they are correct, the early instance of close replication described above shows that these transplanted Aeginetans were already at work in Athens by the closing date of the deposit in which this early replica was found, c. 425 BC.

400–200 BC

Nothing as dramatic as the “Aeginetan incident” occurs in the remaining four centuries of the millennium. Figures for the 4th and 3rd centuries BC show a vigorous revival of the Athenian cooking ware industry (Fig. 16.6). Except for occasional imports present in only one or two examples, the kitchen was now completely stocked with Athenian products, and the level of home-grown diversity is considerable. Close local copies replace the two Aeginetan *chytrai* and the one Aeginetan *lopas* form, and several new forms apparently of local inspiration appear in the 3rd century BC: two *lopades* (Agora forms 2 and 3),³³ the latter of which will persist until the end of the millennium; a two-handled revival of the *parcher* (Rotroff 2006, 187–188); and two new pan forms – a two-handled pan with a grooved

floor, and a delicate, thin-walled frying pan (forms 5 and 7; Rotroff 2006, 191–192, 194). These pans have nothing to do with the large and griddle-like Aeginetan pan of the Archaic and Classical periods, which, as far as I know, Athenian potters never copied. They constitute true innovations that offer the possibility of entirely different modes of food preparation, and perhaps herald the introduction of frying to the cook's repertoire.

200–1 BC

Local staples continue to be the most numerous cooking pots in the final two-century slice of the millennium (Fig. 16.7): the old *chytra* forms adopted from Aegina and the standard Hellenistic *lopas* of form 3. To these is added an elegant *chytra* with a profiled rim and a rope handle, formed in imitation of antique bronze vessels of the 5th and 4th centuries BC (*chytra* form 3). Both the bronze and the clay versions may owe their elaborate form to their use in bathing rather than in cooking, where display was not an issue.³⁴ The only purely local invention is an ungainly baggy cooking pot (*chytra* form 10; Rotroff 2006, 177–178). There are many imported shapes, but only a few of these – two pans and a *lopas* – inspire local imitations in significant numbers. A closer look at the interaction between imports and imitations, broken down century by century, sheds light on the processes at work. The graphs of Fig. 16.8 are arranged to indicate the percentages of local vs. imported examples of the three forms. They are based on inventoried vessels, the numbers of which are small, but a tally of uninventoried examples from selected deposits (given at the top) shows that two of the forms had significant representation.³⁵

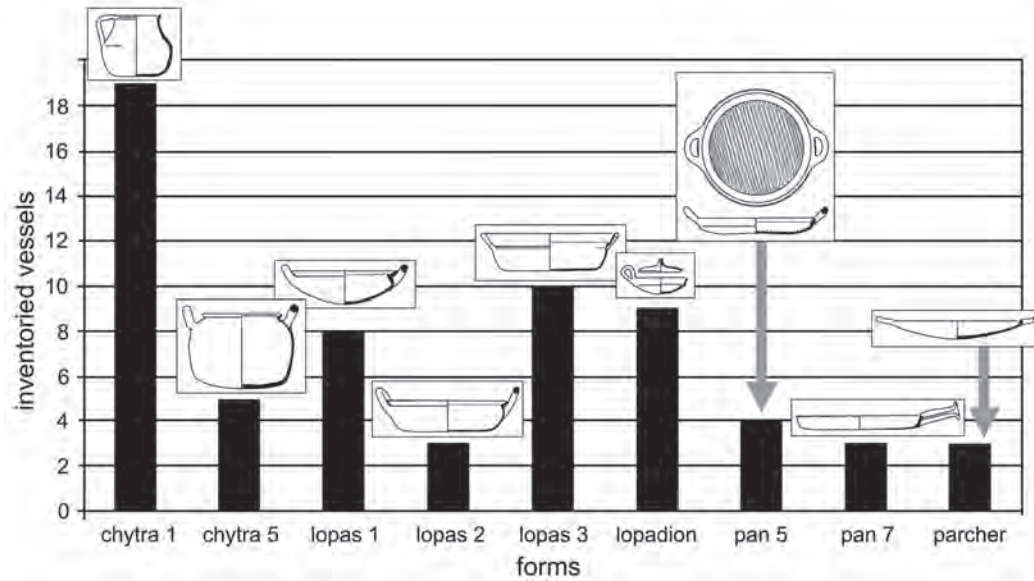


Figure 16.6. Robust forms of the 4th and 3rd centuries BC. Form numbers are those of Rotroff 2006.

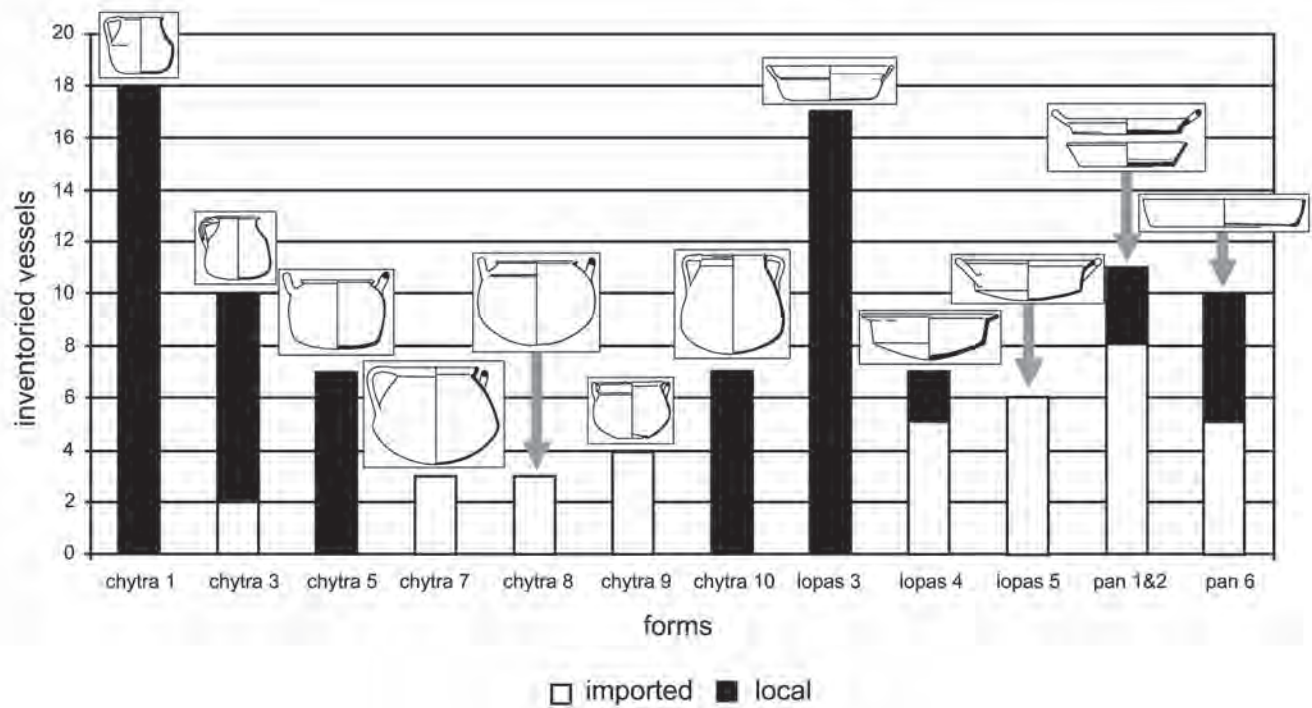


Figure 16.7. Robust forms of the 2nd and 1st centuries BC.

The form 4 *lopas* is a shallow, round-bottomed, two-handled vessel with vertical sides, made of a volcanic-tempered fabric not native to Attica.³⁶ Chemical and petrographic analyses have so far failed to identify its source, but it may have come from the west coast of Asia

Minor. Clearly a superior cooking vessel, it is thin-walled, lightweight, and finely worked, and fragments of at least 35 among inventoried pottery show that it was fairly common. The shape appears in Athens in the first quarter of the 2nd century BC. By the early 1st century BC it was being

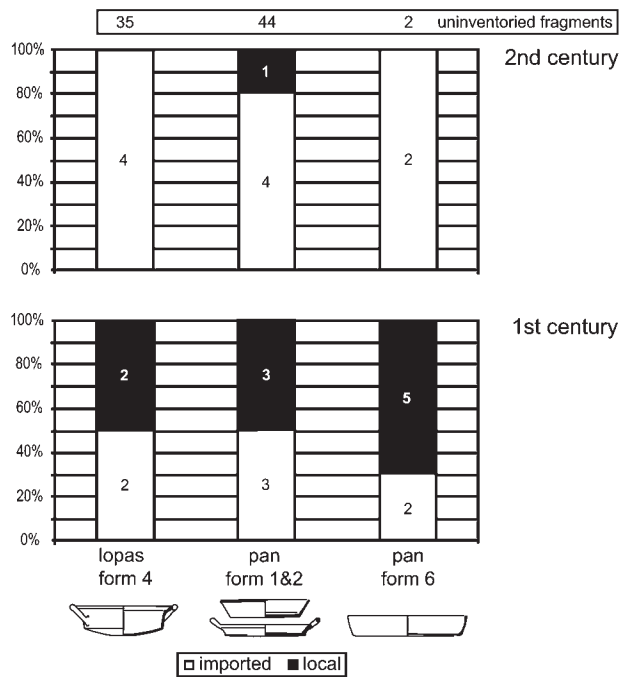


Figure 16.8. Relative representation of imported vs. local versions of three late Hellenistic shapes in the 2nd and 1st centuries BC.

imitated in the local schist-tempered fabric, with a slight change in form, its handles reduced in size and hugging the wall and rim.

Pans of forms 1 and 2, differentiated only by the presence or absence of handles and so lumped together here, are pie-plate-shaped vessels with polished floors, probably griddles or baking pans.³⁷ They first appear as imports in the early 2nd century BC, about contemporaneously with the *lopades* just described. The fabric, characterised by large grey and amber crystals, is coarser but not unlike that of the *lopades*, and these pans too may originate on the west coast of Asia Minor. Most 2nd-century BC pans are of this fabric, but a century later imitations in the local schist-tempered fabric make up half of the inventoried examples. Like the *lopades*, they are relatively common, with 44 uninventoried fragments.

The last of the three imports is the *orlo bifido* pan (form 6), named from the form of the rim, with a fine groove in its top (Rotroff 2006, 192–193). The form arose in the Western Mediterranean in the third quarter of the 2nd century BC. Andrea Berlin has argued that the *orlo bifido* pan was used for the preparation of the Roman quiche-like dish known as *patina*, and that its introduction in the eastern Mediterranean is a marker of Roman presence (Berlin and Slane 1997, 30–31). It first appears in Athens in the last quarter of the 2nd century BC as an import,

characterised by thin walls and nearly vertical sides. Unlike the other two shapes under discussion, the *orlo bifido* pan was rare in the period under consideration. I know of only two uninventoried pieces in Hellenistic deposits, though more exist in Roman contexts (J. Hayes pers comm.). The shape was already being imitated in the early 1st century BC, though not always very closely. The walls may be thicker, or angular instead of straight, or they may slope more steeply, perhaps following the pattern of the by now familiar pans of forms 1 and 2. The characteristic grooved rim, however, is always replicated, underlining the use of a lid. Italian *orlo bifido* pans probably entered Athens via Delos, but local potters began to imitate the shape well before that source of supply would have ceased with the decline of the island after the attacks of 88 and 67 BC.

These three cases provide a contrast to the other major instance of import and imitation in the Athenian record – the deluge of Aeginetan ware in the late 6th and 5th century BC, and its profound effect on the Attic assemblage – and they serve to emphasise the highly unusual character of that situation. What appears to have been the more normal behaviour of Athenian cooking pot manufacturers was either to ignore imported shapes or to absorb them fairly quickly, though not very accurately, into the local repertoire. That, at any rate, is the evidence of this particular 1,000 years. I suspect that many interesting variations – or perhaps repetitions – are to be found in the next 1,000 years, but that I will have to leave to others.

Acknowledgements

I am grateful to the staff of the Agora Excavations for their assistance with this project, and especially to Anne Hooton for her generosity in providing the drawing in Fig. 16.5. John Camp, director of the excavations, kindly gave me permission to review all of the cooking pottery of the 1st millennium, both published and unpublished. I am also beholden to Gudrun Klebinder-Gauss and Sara Strack for many insights into Aeginetan pottery, and again to Sara and to John Papadopoulos for permitting me to include unpublished Iron Age pottery that has been assigned to them for publication in my study.

Notes

- 1 Agora P 19, the first cooking pot inventoried, a Roman frying pan found 23 June 1931 (unpublished).
- 2 Brann 1962 (Late Geometric and Protoattic), Sparkes and Talcott 1970 (Archaic and Classical), and Rotroff 2006 (Hellenistic). Only the PG–MG material still awaits publication. It is currently being studied by John Papadopoulos and Sara Strack.
- 3 For an attempt to clarify the relationship between the cooking vessels in the inventory and in context pottery in the Hellenistic period, see Rotroff 2006, 9–12, and charts 16–21.

- 4 See n. 20 and remarks on the Hellenistic period below.
- 5 The decision to omit the cooking devices is based partly on the different function of these devices, but also on the fact that time precluded a complete examination of this material. My data on devices are therefore not as complete as that on vessels, where I believe I examined almost all of the inventoried examples. The bulk (115 items) of the 150 devices is made up of Hellenistic braziers.
- 6 Some scholars use the term “*chytra*” for both forms, thus emphasising the continuity of function (e.g. Papadopoulos and Ruscillo 2002, 190, 191).
- 7 Sparkes and Talcott 1970, 371, no. 1926, pl. 93 (plain rim) vs. no. 1927 (collared rim), pl. 93.
- 8 None are published from this period; for a later example of the same shape, see Brann 1961a, 115, J 5, pl. 22 (P 22434, Late Geometric).
- 9 For a recent discussion of this phenomenon, see Kistler 1998.
- 10 Burr 1933, 598, no. 225, fig. 64 (P 890); Brann 1961a, 124, 136, 142–143, 145–146, L 47 (=Brann 1962, 55, no. 204), L 48, L 55, O 39, Q 10, R 21, pls. 22–23 (P 12116, P 12126, P 12271, P 17202, P 24850, P 23889); Brann 1961b, 340, F 49, pl. 83 = Brann 1962, 55, no. 206 (P 22731); P 33709 (unpublished, from deposit G 12:26); and probably the handle fragment Young 1938, 426, D 24, fig. 8 (P 9019). Cf. also Kübler 1954, 246, no. 1330, grave 53, pl. 154, from a child’s grave that Kübler dated between 750 and 730 BC (perhaps too early in light of the Agora contexts?). Further study and examination of uninventoried material would be required to establish the chronological limits, but most inventoried examples come from Late Geometric contexts dated by Brann between c. 725 and 690. The only two found in significantly later deposits (third quarter of the 7th century BC) are fragmentary: Brann 1961b, F 49 and Young 1938, D 24. Brann (1961b, 340) found “nothing Geometric” in the decoration of the former, but close inspection shows that, though breakage obscures the design, this jug too carries a swastika.
- 11 As is hinted by Smithson (1968, 83) for the EG period.
- 12 Conze 1890, 137–138; see Rotroff 2006, 200–219, pls. 74–87 for examples of such braziers.
- 13 Papadopoulos 1994, 453, 471, D 2, fig. 14, pl. 118b, c (P 19040, H. 17.5 cm). Papadopoulos identifies it unequivocally as Attic, and macroscopic inspection of the fabric reveals nothing to suggest it is imported; it is certainly not Aeginetan. An even earlier round-bottomed vessel, from an EG well, is much smaller (H. 12.6 cm) and different in proportions (P 6427, Brann 1961b, 340, noted under F 52). Cf. also Young 1949, 296, no. 21, pl. 67 (P 19248), from an EG I grave, smaller yet and incomplete, but possibly round-bottomed as well.
- 14 See below nn. 17 and 18.
- 15 P 27737 (unpublished), from a well I 10:1, filled around the middle of the 6th century BC. A second jug from a deposit spanning the turn from the 7th to the 6th century BC may be a 6th-century product (P 25652, unpublished, well O 12:2). Both jugs reflect the influence of the *chytra* in their squat proportions and convex undersides.
- 16 For a similar change taking place in Crete see Whitley and Boileau this volume; for the practicalities of cooking with cooking jugs, see Lis this volume and Fourrier this volume.
- 17 Farnsworth (1964, 223–224) first identified Aeginetan pottery at the Agora through petrographic analysis (perhaps the first to be applied to post-prehistoric pottery in the Aegean region, 221), and John Hayes noted that most of the Archaic *chytrai* published in Sparkes and Talcott 1970 are Aeginetan (Boardman and Hayes 1973, 59, with n. 1), but the remarkable scope of Aeginetan imports has only now been realised, through Klebinder-Gauss’ study (Klebinder-Gauss 2012; see also Gauss *et al.* this volume). I am grateful to her for providing me with the text of her book in advance of publication and for many generous discussions of her project and of the Agora pottery. The following analysis of the interrelationship between Attic and Aeginetan pottery at the Agora parallels the work of Klebinder-Gauss and Sara Strack, reported in this volume in advance of a more detailed publication currently in preparation (Klebinder-Gauss and Strack in prep.), and of which I learned only after I was well advanced with my own review, initiated in preparation for the British Museum conference. Our results and approaches differ in a few small ways. Klebinder-Gauss and Strack have made more distinctions among the different Attic and Aeginetan fabrics, while I have categorised pottery more broadly as simply Attic or Aeginetan. They base their study on the sample of pottery published in Sparkes and Talcott (1970), while I have attempted to include all inventoried vessels and some unpublished cooking devices. We both base our assessments of the fabric of the Agora vessels on macroscopic examination, and I am grateful to Gudrun and Sara for discussions of the earmark features of Aeginetan ware. We have only occasionally disagreed about the likely provenance of a given object.
- 18 Brann 1961b, 340, F 52, pl. 83 (P 22730).
- 19 Brann 1962, 55, no. 210, pl. 11 (P 10668, from B 14:5, dated 625–585/575 BC in Sparkes and Talcott 1970, 384); Sparkes and Talcott 1970, 371, nos. 1922, 1923, pl. 93, fig. 18 (P 18532, dated to 575–560 BC; P 1260, dated to 575–535 BC).
- 20 A survey of the deposit summaries in Sparkes and Talcott (1970) shows well over 100 deposits laid down in the 5th century BC, in contrast to 65 in the 6th, and only 27 of the latter were deposited before 525 BC.
- 21 The total number of inventoried vessels from this span that I examined is 32, of which at least 23 are Aeginetan, six Attic, and three of uncertain origin. Aeginetan is also well represented among the uninventoried pottery of the few Persian destruction contexts that I have examined.
- 22 For example, at Tocra and in the Lipari Islands: Boardman and Hayes 1966, 135–137, fig. 66, pl. 90; Boardman and Hayes 1973, 58–61, fig. 24, pl. 31; Bernabò-Brea and Cavalier 1965, pl. 59.1c, 2, 3c, 5c, 6a.
- 23 P 16810 (unpublished) from well G 15:1, deposited c. 500 BC (Sparkes and Talcott 1970, 391).
- 24 Sparkes and Talcott 1970, 372, nos. 1943, 1944, pl. 94 (P 8875, P 8874), both from well E 14:5, deposited c. 490 BC. Both have vertical handles, unlike the canonical form with horizontal handles, which first appears in Persian debris: e.g. Sparkes and Talcott 1970, 372, no. 1947, fig. 18, pl. 94 (P 25771), from the Stoa Gutter well (Q 12:3), now thought to have been deposited c. 480 BC (Shear 1993, *passim*).
- 25 E.g. Sparkes and Talcott 1970, 373, no. 1960, pl. 95 (P 2360), from a deposit of c. 440–425 BC.
- 26 For the shape, see Sparkes and Talcott 1970, 375, no. 1987, fig. 17, pl. 96 (P 10128); Rotroff and Oakley 1992, 121, no. 322, pl. 58 (P 31657) provides the earliest context (before c. 425 BC). The shape disappears after the early 3rd century BC (Retroff 2006, 187–188).
- 27 Sparkes and Talcott 1970, 378, no. 2031, fig. 19 (P 2116). Talcott and Sparkes dated the context of a second Aeginetan brazier to the third quarter of the 4th century BC (Sparkes and Talcott 1970, 378, nos. 2032 and 234, n. 19, P 20990), but more intensive study

of the stratigraphy reveals that the brazier was found lying on a late-5th-century BC floor (see Townsend 1995, 169, under no. 17, and 211).

- 28 P 23679 (unpublished) from deposit R 11:3, dated 450–425 BC (Sparkes and Talcott 1970, 398).
- 29 Corbett 1949, 335–336, no. 99 (P 11015) from B 15:1; for illustrations, see Rotroff 2011, 124, figs 10, 11.
- 30 The earliest inventoried example is Sparkes and Talcott 1970, 372, no. 1933, pl. 93 (P 25007), from a deposit dated 575–540 BC.
- 31 Talcott 1935, 513, no. 78 (P 2359), identified [by me] as Attic on the basis of the fabric, found in well R 13:4 together with two Aeginetan imports: Talcott 1935, nos. 77, 79 (P 2359, P 2360), the latter also published by Sparkes and Talcott (1970, 373, no. 1960, pl. 95). The well fill dates c. 440–425 BC (*ibid.*, 398).
- 32 Klebinder-Gauss 2012, 177–178; Strack and Klebinder-Gauss forthcoming.
- 33 Henceforth I use the form numbers published in Rotroff 2006. For these two forms, see Rotroff 2006, 180–182.
- 34 Rotroff 2006, 170–171; for the metal version, see Vokotopoulou 1986, 288–289, fig. 81, pls. 16, 17, 39, 286.
- 35 Unfortunately I do not have data on the fabrics of the uninventoried fragments, so am obliged to base these graphs on the much smaller sample of inventoried vessels.
- 36 Rotroff 2006, 183–186. For the fabric, see *ibid.*, 45–46.
- 37 Rotroff 2006, 188–190. Their generally smaller size precludes identification as a portable hearth. For the fabric, see *ibid.*, 47–48.

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MEDITERRANEAN-TYPE COOKING WARE IN INDIGENOUS CONTEXTS DURING THE IRON AGE IN SOUTHERN GAUL (6TH–3RD CENTURIES BC)

Anne-Marie Curé

From ceramic to culture: Iron Age kitchen ware in southern Gaul

For a long time, kitchen ware was of little interest to archaeologists. Considered less attractive than other types of ceramic because of its coarser appearance, it also seemed less appropriate for studies of economy and trade, the central issues upon which the discipline had focused. Often dismissed as local or even domestic products, reserved for purely domestic use, these vessels were long subject to only a few typo-chronological studies.

In the 1980s, M. Bats revitalised the approach to this type of pottery – and to table and kitchen ware more generally – by offering an ethno-cultural reading of the assemblages of the Greek colony at Olbia (Hyères, Var), and thus demonstrating the potential of a study allying cultural, morphological and functional considerations to the comprehension of food preparation and consumption habits in Greek or indigenous settlements of Mediterranean Gaul (Bats 1988). Later, Bats again drew upon kitchen ware to reflect upon the issues of cultural contact, acculturation and ethnic identity (Bats 1992; 1994; 2007). The analysis of *batteries de cuisine*, composed of indigenous pots and Greek-type vessels, carried out in parallel between settlements of southern Gaul and Magna Graecia, brought him to a set of differing interpretations. In the case of southern Gaul, particularly at the site of Lattara (Lattes, Hérault), the presence of Greek cooking ware reflected, according to him, the presence of Greeks in the city. By contrast, Bats took

the presence of the same vessels in a number of settlements close to Greek colonies in southern Italy as evidence for the integration of new practices into indigenous culinary habits (Bats 1994).

The idea of measuring the degree of acculturation exhibited by an indigenous population was used by E. Gomez in a study of mortars. Gomez considered these instruments as “cultural markers” which could reflect the degree to which the inhabitants of a settlement had been Hellenised (Gomez 2000, 141). This kind of assertion offers a unilateral vision of acculturation phenomena, by regarding the adoption of foreign items purely as a manifestation of the willingness of indigenous populations to copy Greek consumption habits, without taking into account the ways in which these new items could be integrated into local practices. It clearly illustrates the pitfalls into which the study of Mediterranean-type cooking vessels can lead.

Obviously, it is impossible to generalise about the presence of Mediterranean-type cooking ware in the indigenous Iron Age settlements of southern Gaul. In this large geographical area – with a coastline of more than 500 km extending from the Pyrenees to the Alps – there must have been a multiplicity of regional and local situations, arising from the variety of types of contact between indigenous and exogenous populations (colonial foundations, the emergence of trading posts, visits by merchants, and so on) and also from the diverse responses of different ethnic groups.

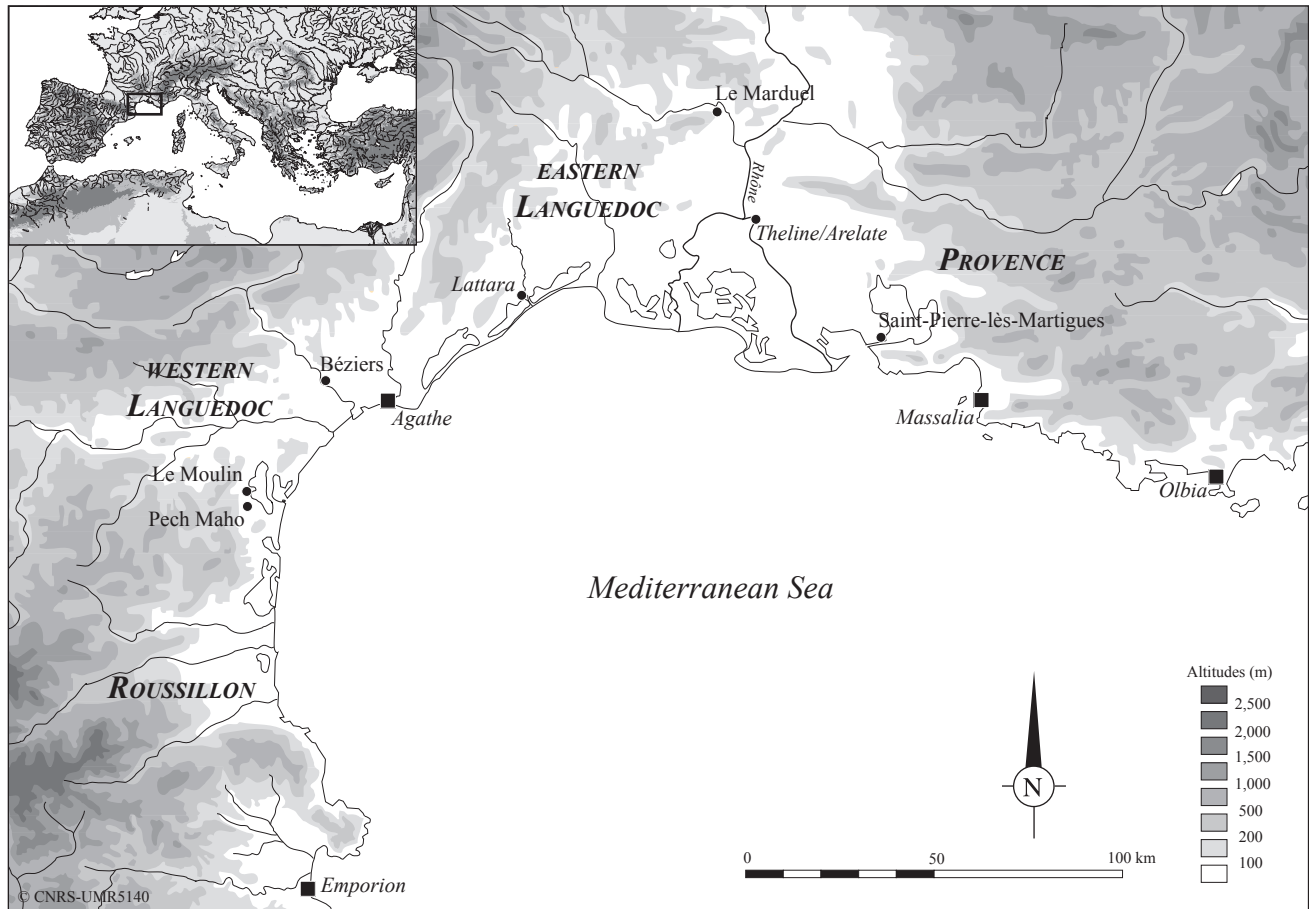


Figure 17.1. Location of the main sites mentioned in the text. Saint-Pierre-lès-Martigues (Martigues, Bouches-du-Rhône); Theline/Arelate (Arles, Bouches-du-Rhône); Le Marduel (Saint-Bonnet-du-Gard, Gard); Lattara (Lattes, Hérault); Béziers (Hérault); Le Moulin (Peyriac-de-Mer, Aude); Pech Maho (Sigeac, Aude). Squares mark the Greek colonies of Olbia (Hyères, Var), Massalia (Marseille, Bouches-du-Rhône), Agathe (Agde, Hérault) and Emporion (l'Escal, Girona, Spain).

Mortars

In the pottery typology current for southern France (Py 1993), a mortar is a shallow open bowl, with thick walls. Usually of large diameter, it may have a spout and handles, and may present an abrasive surface. These morphological and technical features have led researchers to assume that this object was used for crushing and preparation functions (*ibid.*), without knowing precisely which culinary operations employed it.

Owing to its widespread use in Greek world, and because it was originally an imported item, the mortar has sometimes been described as a “Greek cultural marker” (Gomez 2000, 115). However, we must be cautious in our interpretations of this vessel, imported into a cultural environment quite different from the one in which it originated. Indeed, given that the mortar offers varied potential uses, it is not possible to state whether it was

employed for the same preparations in southern Gaul as it was by the Greeks, who themselves might have used it in many different ways, according to place and period (Villing and Pemberton 2010, 602–627).

Production and distribution of mortars in southern Gaul

Mortars are widely distributed in Mediterranean Gaul, appearing at most indigenous sites occupied between the 6th and the 3rd centuries BC. The earliest imported pieces, dating back to the end of the 7th or first half of the 6th century BC, are likely to be the Greek mortars found in Provence at Saint-Blaise (Saint-Mitre-les-Remparts, Bouches-du-Rhône: Bouloumié 1992, 209–211) and Tamaris (Martigues, Bouches-du-Rhône: Duval 1998, 151; 2003, 83). Local production of mortars seems to start during the second quarter or around the middle of the 6th century BC.

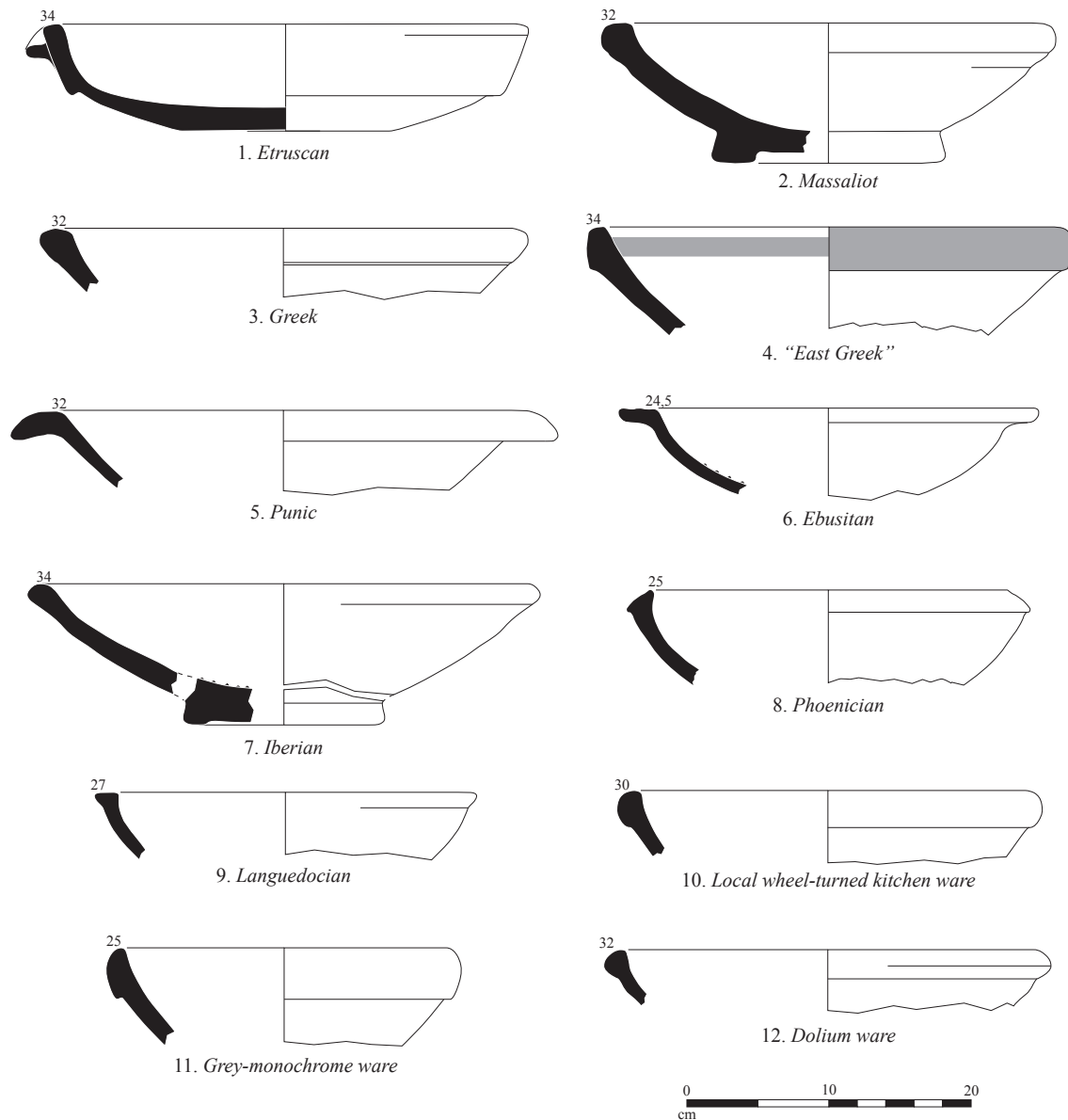


Figure 17.2. Main mortar types attested in southern Gaul. 1. Lattes, 510–475 BC; 2. and 4. Pech Maho, 540–510 BC; 3. Lattes, 450–425 BC; 5. Lattes, 350–325 BC; 6. Pech Maho, 225–200 BC; 7. Pech Maho, 450–325 BC; 8., 9. and 11. Pech Maho, 510–450 BC; 10. Béziers, 5th–4th centuries BC (Gomez 2000, 133, fig. 27, B.1215); 12. Sauvian, 5th–4th centuries BC (Gomez 2000, 133, fig. 28, S.1056).

The most ancient specimens are mortars manufactured in regional wheel-made cooking ware and grey-monochrome ware, coming from the settlement of La Monédière in western Languedoc (Bessan, Hérault; Nickels 1989, 88, 103). Nevertheless, a clear partition appears between western Languedoc on the one hand, and eastern Languedoc and Provence on the other. Massaliot mortars – produced at the Greek colony of Massalia (Marseille, Bouches-du-Rhône) – are found in the latter region, especially in

settlements in the lower Rhône basin where they constitute the predominant, if not the only, mortar variety. Western Languedoc and Roussillon, by contrast, have yielded imported pieces of much more diverse origins – Etruscan, Greek, Massaliot, Iberian, Punic and Phoenician – as well as several regionally produced items: Languedocian mortars, regional wheel-made cooking ware, grey-monochrome ware and dolium ware (Curé 2010, 189–191; Figs. 17.1 and 17.2).

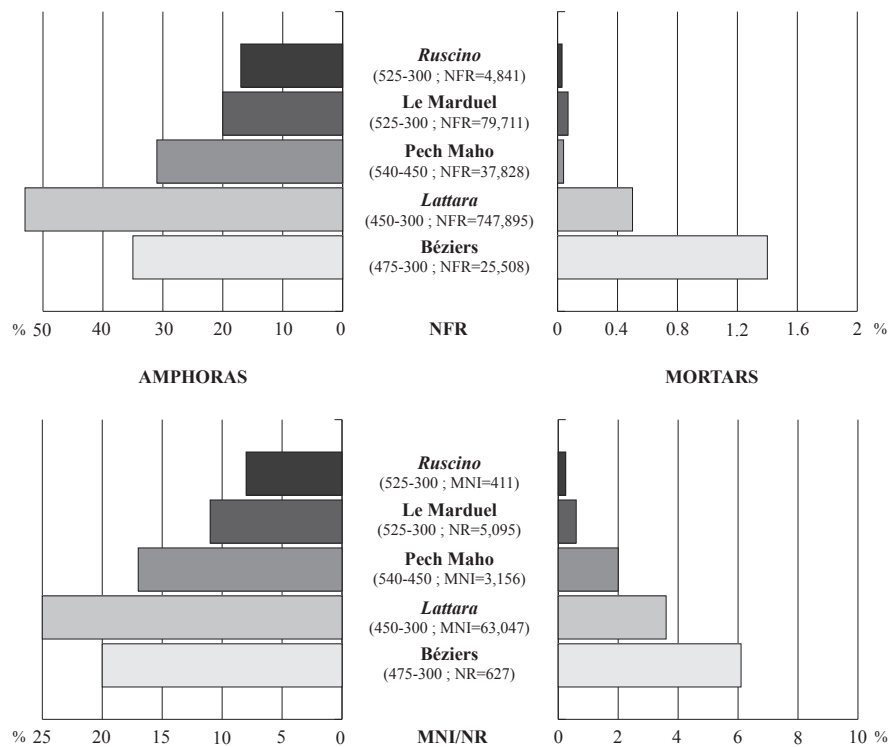


Figure 17.3. Comparison of the rates of amphorae and mortars at five Languedocian settlements. Percentages are calculated on the basis of all pottery finds, in number of fragments (NFR) and minimum number of individuals (MNI) or number of rims (NR).

The integration of the mortar into the indigenous batterie de cuisine

No ceramic form in the indigenous repertoire seems specifically designed to crush food, yet the grinding of cereals or other vegetables was undoubtedly already a common practice before the first mortars were imported. In addition to the steady presence of grinding stones at indigenous sites, the predominant use of urns for cooking seems to point to a diet based on gruels and stews. The adoption of mortars might, therefore, go together with new preparation practices.

Given that wine from the Etruscan, Greek, Punic and Iberian worlds began to be shipped into southern Gaul as a major commodity at this time, we can envisage a connection between the appearance of mortars and wine consumption. A link between the two would then explain the presence of mortars – in relatively significant proportions – in nearly all settlements. The hypothesis of a relationship between mortars and wine consumption is all the more interesting insofar as a link between mortars and amphorae seems to exist.

Mortars and amphorae

The question of the relationship between mortars and

amphorae can first be approached from a technical point of view. Indeed, two of the best-represented mortar productions – the Etruscan and Massaliot – employ fabrics identical to those used in amphora production.

To this qualitative link we can add a quantitative argument based on the comparison of amphora and mortar counts. A study of five Languedocian settlements highlights a correlation between these two vessel types: the higher the rate of amphorae, the higher the rate of mortars (Fig. 17.3). This would suggest that mortars were deliberately imported together with amphorae. In addition, this observation is reinforced by the similar origins of amphorae and mortars in most of the settlements (Curé 2010, 194–195).

If the correlation between the origin of amphorae and mortars partly reflects regionally differentiated commercial networks, mortars cannot be regarded as mere additional freight, adopted by local populations only because of their availability. It seems more likely that these objects were selected in order to be used within a specific practice: wine consumption. Indeed, even if various other commodities besides wine (olive oil, fish sauce, brines, salted fish or meat, olives or beer) are likely to have been transported in amphorae, it seems that the main product shipped into Mediterranean Gaul was wine (Curé 2010, 195).

Mortars and wine consumption

Until the 3rd century BC, the wine trade stimulated all imports of fine ware, since most such ceramics were associated with drinking. Although such vessels – cups, beakers, jugs, kraters – allow one to imagine the consumption of various beverages, drinking ware was nonetheless fundamentally associated with wine. Indeed, not only were these vessels related to a Graeco-Etruscan repertoire undoubtedly linked to wine consumption, but they can be understood only with regard to the large number of wine amphorae transported into southern Gaul at this time. The demand for this drink can be explained by the social role its consumption could take within indigenous societies. Whether for feasts, or political or religious events, the consumption of wine appears to have been quite frequent and widespread, while still associated with specific artefacts (Dietler 1990). In this context, it is likely that mortars had a role to play in wine consumption, or in the preparation of food to be consumed together with wine. The presence of these vessels at a few sites further away from the Mediterranean coast, along with amphorae and fine ware, could be another indication of this kind of associated use. Indeed, mortars can be found in some middle Rhône basin settlements, and further upstream as far as Lyon (Rhône) (Perrin and Bellon 1992, 426–427; Bellon 2003, 85).

We can thus suggest that these vessels may have been used to crush spices or aromatic herbs for the preparation of wine. This use has been proposed by researchers for Phoenician tripod-bowls, which were also present in Latium and Etruria (Botto 2000), as well as on the Iberian peninsula (Vives-Ferrándiz 2005). In addition, the presence of a few graters in tombs or settlements of southern Gaul (Giry 1965, 155, 229; Solier and Fabre 1969, 99, fig. 5, 5; Curé 2010, 196) might indicate that wine was not necessarily always consumed pure by local populations, as is often stated (Bats 1988, 211–214). Indeed, D. Ridgway (1997) associated such items in the Greek and Etruscan worlds with cheese-grating, and more specifically with the preparation of *kykeon*, a wine-based mixture. Even if we do not know how the graters were employed in indigenous contexts, we must not reject the possibility of a similar use, linked to wine consumption, as has been proposed for Italy (Ridgway 1997; Bartoloni 2003, 205) or Catalunya (Graells 2005).

It seems, therefore, that we could consider the mortar as an exogenous vessel adopted and adapted for indigenous consumption practices. These practices would then have integrated some customs common to other Mediterranean populations. Nevertheless, mortars may have been used in other preparations involving secondary imported products, such as olive oil. Moreover, we must seriously consider the possibility of a shift or a broadening of the function of this object over the course of four centuries.

After a phase perhaps characterised by a use focused on wine consumption, the mortar might have been used subsequently for daily cooking, which would explain its manufacture in regional wheel-made cooking ware and dolium ware from the 5th century BC onward. Indeed, all vessels usually listed as mortars might not have had the same function, and morphological and technical variations may reflect different uses.

Cooking ware

In most settlements, the Iron Age *batterie de cuisine* consists of local or regional ceramics, mostly hand-made but sometimes also wheel-turned, characterised mainly by urns and bowls. At a few sites, Etruscan cooking ware is also present in the form of urns with a morphology close to that of indigenous pots, as well as cups-lids – that is, vessels which may have been used both as cups and lids. Additionally, Mediterranean-type cooking ware exists at some sites, distinguished from the indigenous vessels by its original shapes, and usually round-bottomed (Fig. 17.4). Thus, in southern Gaul, *chytrai*, *caccabai* (lidded *chytrai*), *lopades* and lids are attested from the 6th to the 3rd century BC (typology: Py 1993). Given that only a handful of coastal sites have yielded these vessels, a case-by-case study seems necessary in order to define more accurately the different consumption contexts and to comprehend the modalities of cultural contact in each settlement.

Saint-Pierre-lès-Martigues (Martigues, Bouches-du-Rhône)

The settlement of Saint-Pierre-lès-Martigues had, from the middle of the 6th century, close links with the Greek colony of Massalia, located about 30 km away (Fig. 17.1). The principal consumption of Massaliot ceramics at this site, as well as of products whose distribution was controlled by Massalia, provides evidence for these close ties.

For the period 560–490/480 BC, Greek cooking ware – represented by *chytrai* and *caccabai* – constitutes less than 0.5% of the fragments of pottery and individual specimens: almost all of the *batterie de cuisine* consisted of local hand-made vessels (Duval 2006, 115–118). At such an early period, this small number of items can perhaps be associated with the presence of Greeks – perhaps from Massalia – at the site, even if the possibility of indigenous people cooking with this ware cannot be completely excluded.

TheLINE/Arelate (Arles, Bouches-du-Rhône)

The case of Arles is particularly interesting owing to the

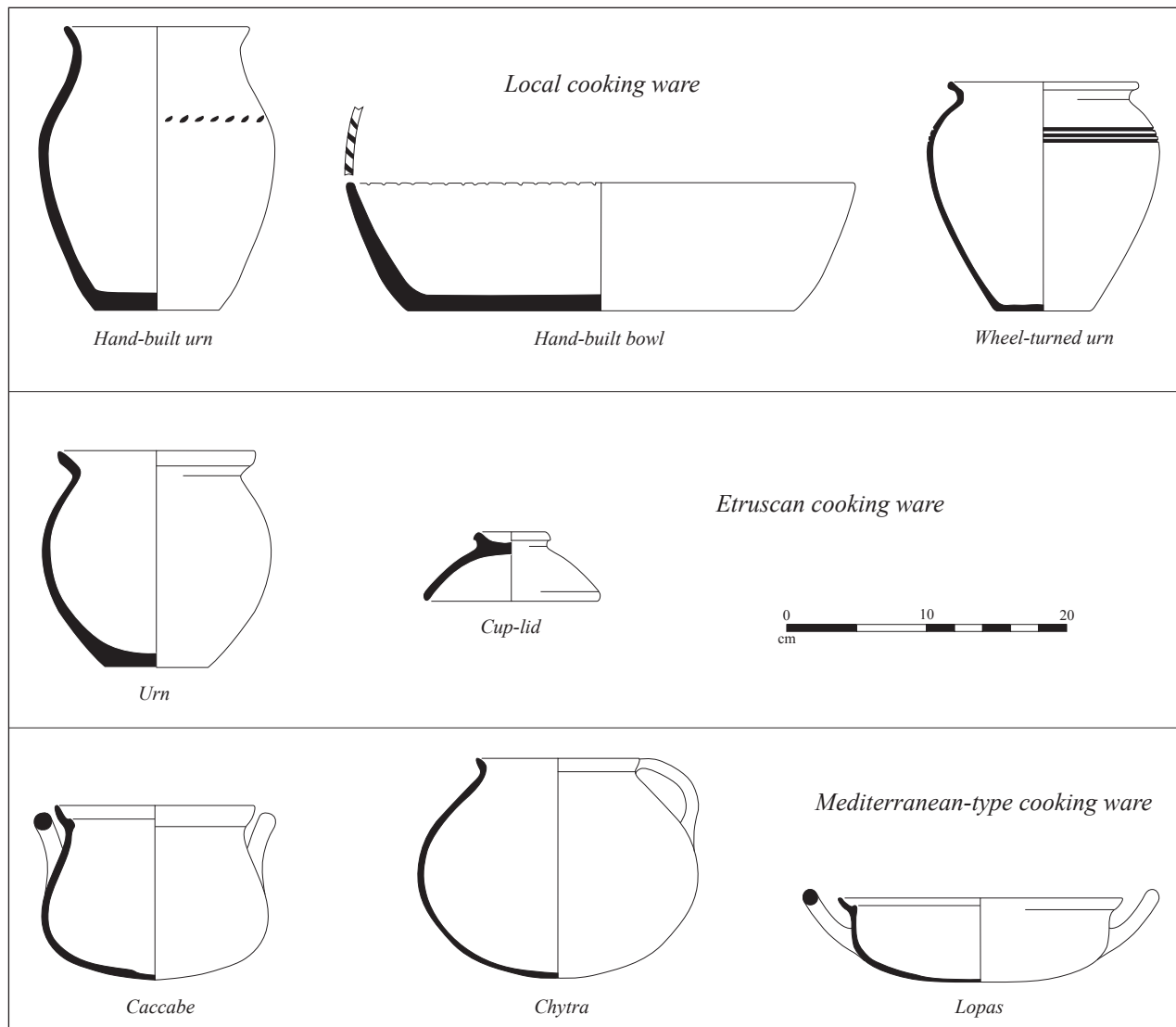


Figure 17.4. Cooking ware in southern Gaul: fabrics and main shapes (after Py 1993).

changes that can be observed in the pottery profile, as well as in architecture and urbanism, between the 6th and the 3rd centuries BC (Fig. 17.1). After an indigenous phase in the first two-thirds of the 6th century, pottery assemblages indicate a change in the economic function of the site at around 540/530 BC. After this point, the settlement appears to have become a trading station of Massalia. The possibility of a colonial attempt by the Greeks from the Phocaeen city at the end of the 5th century BC (Theline) has been proposed, both on the basis of the ceramic assemblages – characterised by a low rate of hand-made ware and a massive consumption of fine ware of Massaliot repertoire – and on the existence, at least in one part of the city, of an original orthogonal grid plan (Arcelin 1995; 2008). These

specific features suggest that whatever the site's status at that time, it is plausible that Greeks (Massaliots?) lived in the settlement between the end of the 6th and the 5th centuries BC (Gailledrat 2010a, 181–182).

Mediterranean-type cooking ware – coming from Greece or Magna Graecia between 540/530 and 350 BC – may thus be related to a Greek presence at the site of Arles. However, this pottery, even if continuously present, seems to have been rather scarce, constituting at most 2% of the pottery fragments between 490 and 375 BC (Arcelin 1995, 330). If the Greek presence is as significant as the other artefacts seem to indicate, then the *batterie de cuisine* used by the Greeks was presumably composed also of local hand- and wheel-made urns. Moreover, some Mediterranean-type

cooking pots might have been used by indigenous people who, in contact with Greek populations, modified their culinary habits.

The presence of a few Greek cooking pots at La Capelière (Arles, Bouches-du-Rhône), a few kilometres south of Arles city centre, could as well be linked to the presence of Greeks in this area (Rothé and Heijmans 2008, 744–753).

Le Castelet (Fontvieille, Bouches-du-Rhône)

Located less than 10 km north of Arles, the site of Le Castelet, occupied from the second quarter of the 6th century BC onward, has yielded Etruscan, Greek and Massaliot amphorae and table ware, as well as a few Greek cooking pots: *chytrai*, *lopades* and lids (Martin-Kobierzyki 2009) (Fig. 17.1). As at Saint-Pierre-lès-Martigues, these imported cooking vessels represent less than 0.5% of the pottery fragments – most of the *batterie de cuisine* being constituted of hand-made pots – and are likely to be associated with Greeks frequenting the settlement.

Le Marduel (Saint-Bonnet-du-Gard, Gard)

The settlement of Le Marduel, in eastern Languedoc, offers a pottery profile characteristic of the indigenous sites of the hinterland (Fig. 17.1). From the 6th to the 3rd century BC, we can observe an overwhelming majority of local hand-made ware, as well as regional wheel-made ware and a few Mediterranean imports. The origin of amphorae, which are mainly Massaliot, reflects the economic influence of the Greek colony in this area.

The discovery of a batch of Massaliot coins and four *caccabai* manufactured in regional wheel-made cooking ware in levels dated between 450 and 440 BC (Py and Lebeaupin 1992, 262–269) might perhaps indicate the presence of a foreign trader – Greek or Massaliot? – at the settlement. Indeed, we need to underline that *caccabai* manufactured in the region are very scarce, and attested in eastern Languedoc only at Lattara (Lattes, Hérault: see below), and by a single item at Vié-Cioutat (Mons-Monteils, Gard: Dedet 1978, 30, fig. 6). Finally, a single sherd of imported Mediterranean-type cooking ware is known from this site: a *lopas* rim, found in a layer dated to the second half of the 3rd century BC (Py and Lebeaupin 1989, 177).

Lattara (Lattes, Hérault)

The coastal site of Lattara, occupied from the end of the 6th century BC onward, has the peculiarity of having yielded evidence for an Etruscan installation at the beginning of its occupation, between 510 and 475 BC, at least in one part of the settlement (Fig. 17.1). After this time, ceramic assemblages indicate a reorientation of the

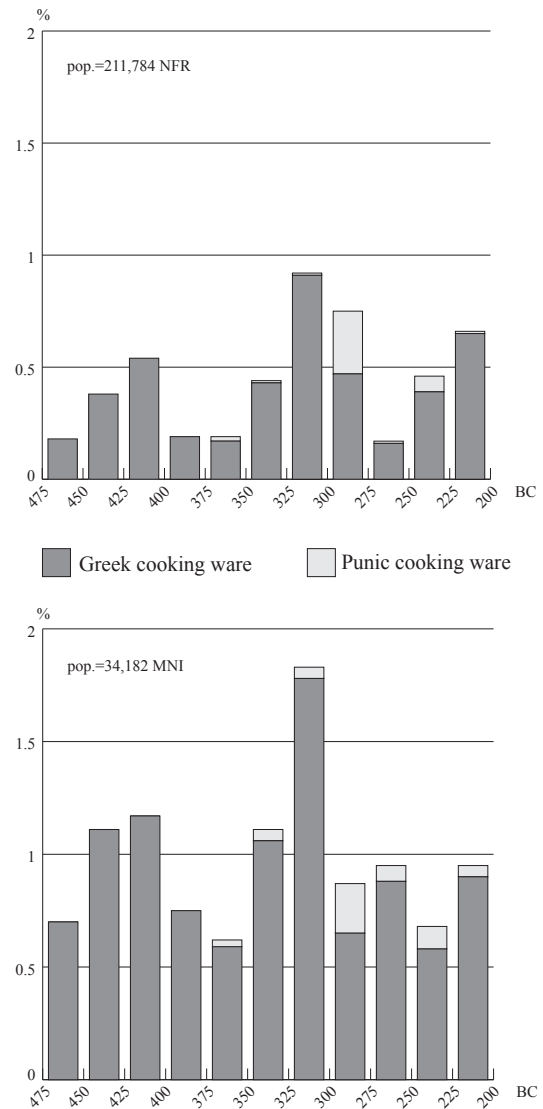


Figure 17.5. Evolution of imported cooking ware frequency among table and kitchen ware at Lattara between 475 and 200 BC, in number of fragments (NFR) and minimum number of individuals (MNI).

city's commercial activity, over which the Greek colony of Massalia seems to have exercised a virtual monopoly. Products of the Phocaean city, and especially wine, arrived along with products from the Greek, Iberian and Punic worlds, and from the Italic peninsula. As a real trading post, Lattara was not only an important place of consumption: it also played a role in the redistribution of products toward other indigenous sites.

Between 475 and 200 BC, Greek cooking ware represents from 0.6 to 1.8% of the individual specimens of table and kitchen ware. If the average rates for each century seem

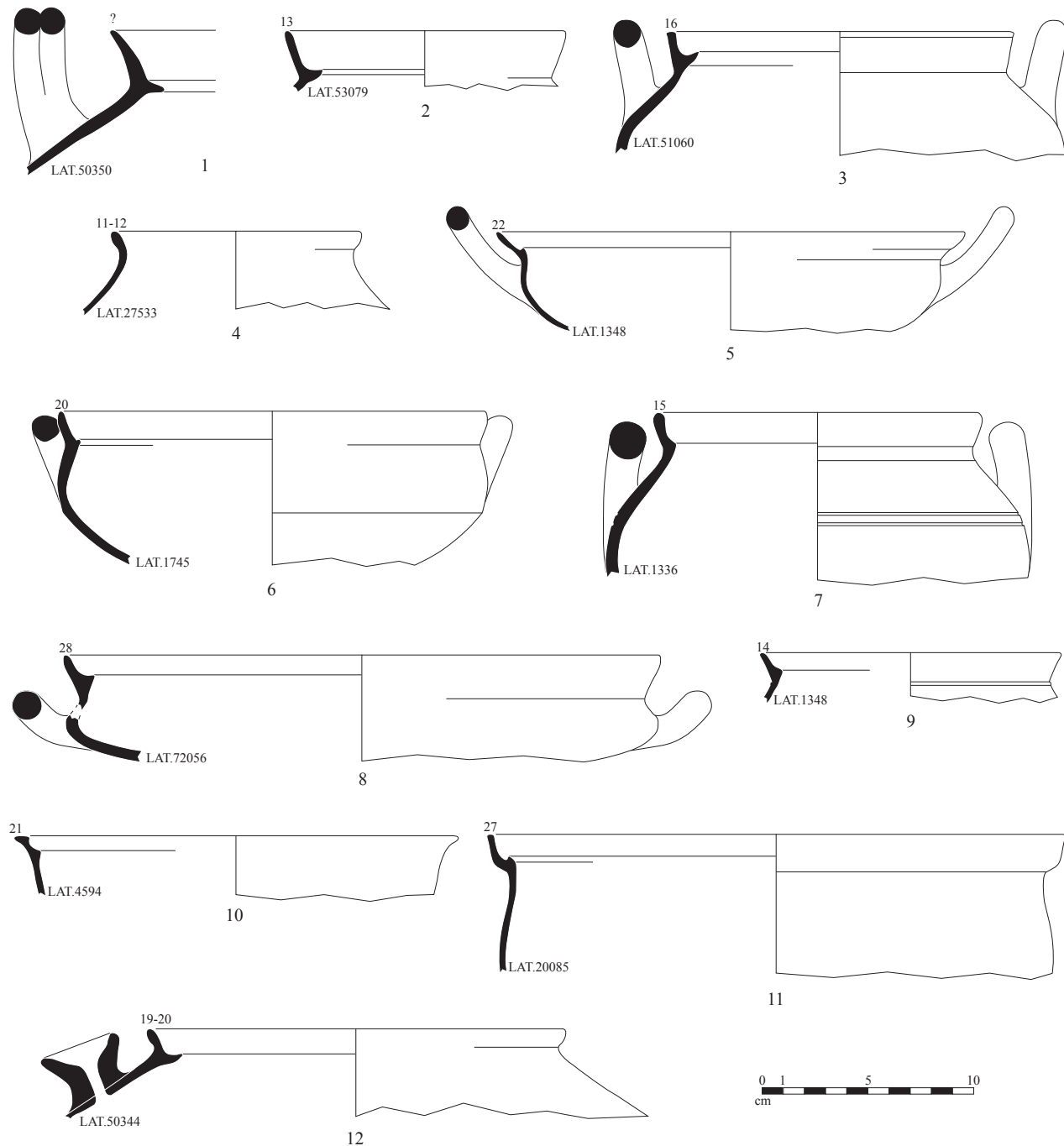


Figure 17.6. Main Mediterranean-type cooking ware productions and shapes at Lattara between 475 and 200 BC. 1. Greek *caccabe* (fabric attested between 475 and 375 BC); 2. Greek *caccabe* (475–375 BC); 3. Greek *caccabe* (425–375 BC); 4. Greek (Aeginetan?) *chytra* (450–375 BC); 5. Greek *lopas* (375–200 BC); 6. Greek *lopas* (350–275 BC); 7. Greek *caccabe* (350–200 BC); 8. Greek *lopas* (375–200 BC); 9. Greek *caccabe* (350–275 BC); 10. Greek *lopas* (250–200 BC); 11. Punic *lopas* (375–200 BC); 12. Local wheel-turned kitchen ware *caccabe* (450–375 BC).

rather stationary – around 1% of the individual specimens of table and kitchen ware – we register higher rates for the periods 450–400 and 350–300 BC (Fig. 17.5). Altogether, there are 11 well-recognised fabric groups, as well as several

pieces of various other productions (Fig. 17.6). Along with the traditional indigenous urns, eastern Languedoc wheel-turned cooking ware imitations of *caccabai* were also made during the second half of the 5th century BC.

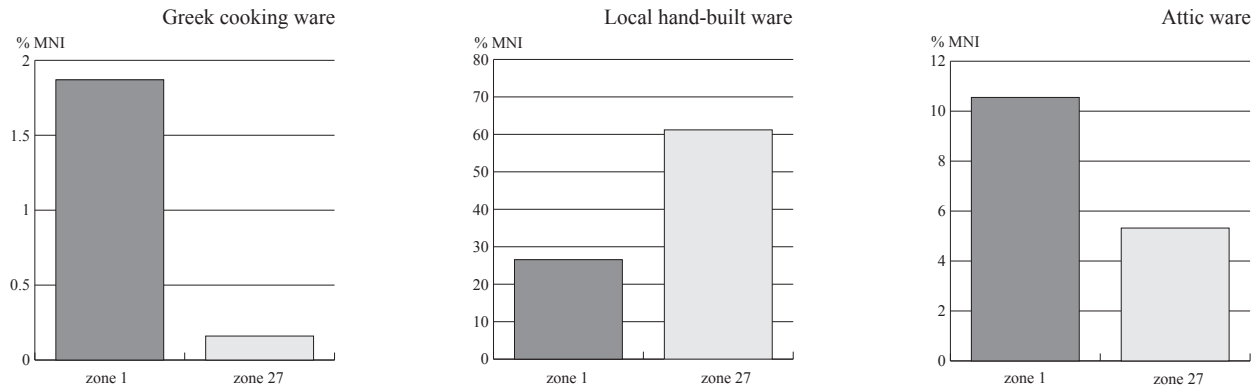


Figure 17.7. Comparison of the rates of Greek cooking ware, local hand-built ware and Attic ware among table and kitchen ware in zones 1 and 27 at Lattara between 425 and 400 BC, in minimum number of individuals (total of table and kitchen ware: zone 1 = 2,776 MNI; zone 27 = 1,822 MNI).

The manufacture of such vessels reinforces the idea of an increased demand for this particular ceramic form at this moment.

Around 375 BC, a break is marked by the use of new fabrics for Greek ceramics, replacing previously imported productions, and by the appearance of Punic cooking ware (Curé unpublished). This cooking ware, coming from Carthage or nearby areas, consists of vessels with a typology identical to the Greek cooking ware, including *caccabai*, *lopades* and lids. At the same time, the composition of the cooking ware repertoire also seems to have evolved, for it is at this point that we have clear evidence for the use of the *lopas*. Its increased use during the 4th and the 3rd centuries BC can be related to the use of fish-plates, these two vessels usually being associated with the preparation and serving of braised or fried fish in olive oil. Fish-plates are indeed known from Lattara from the end of the 5th century BC onward, and the continuous increase in the rate of their appearance during the next two centuries tends to suggest an evolution of the culinary preparation and consumption habits of a part of the population.

A comparative study of the pottery of two *intra-muros* excavation areas – zones 1 and 27, located less than 150 m from each other – for the last quarter of the 5th century BC allows us to highlight significant differences between the two areas. During this period, the prevalence of Greek cooking ware is particularly low in zone 27 and, on the contrary, particularly high in zone 1: 0.16 and 1.87% of the table and cooking ware individual specimens, respectively. Moreover, the zone 1 assemblage contains only about half the proportion of local hand-made ware compared to that found in zone 27, but twice the proportion of Attic ware (Fig. 17.7). It thus appears that in zone 27, local or regional ware was predominant, whereas the inhabitants of zone 1 consumed more imported ware, especially wares

of the Greek repertoire. In addition, amphora sets show a difference in the provisioning of the two areas, with a more varied pattern in zone 1, characterised by the presence of Iberian and Greek amphorae that could have contained olive oil (Gailledrat 2010b, 458–459). Archaeobotanical remains also suggest variations in the treatment and consumption of vegetable products between the two areas of the settlement (Alonso and Rovira 2010). Finally, the zooarchaeological analysis of fish remains from both areas highlights an increased and somewhat more diversified consumption of fish in zone 1, perhaps with the provision of Punic sauces or salted fish (Piquès 2010). All of these factors allow us to envisage, for the end of the 5th century BC, the existence of groups with divergent consumption habits, which could be explained by cultural and/or social differences. Another sign of the presence of foreigners at Lattara would be the association in a domestic unit of a small Punic *batterie de cuisine* composed of a *lopas*, a *caccabe* or *lopas* and two lids, in a layer dating back to the start of the 3rd century BC.

To conclude, Mediterranean-type cooking ware may have been used at Lattara by foreign individuals, whose presence at the settlement is very likely. Nevertheless, we cannot exclude the possibility that these ceramics might have been used as well by indigenous populations, whose culinary practices could have been modified in contact with those foreigners. The lack of a global change in the *batterie de cuisine* over the course of three centuries, however, suggests that any modification in the food preparation habits of Lattara's inhabitants was not profound but, at most, a limited adaptation of the culinary practices of a fraction of the city's population.

Béziers (Hérault)

The settlement of Béziers was occupied between the

second quarter of the 6th century and the end of the 4th century BC (Fig. 17.1). Fifth- and 4th-century levels have yielded pottery characterised by an abundance and diversity of amphorae as well as table and kitchen ware. These ceramics are predominantly Massaliot and Greek products, but there is also a number of Iberian and Punic imports. In the category of local and regional ware, there are few hand-made vessels: table and kitchen ware is mainly characterised by wheel-made products. Like Lattara, Béziers appears to be a trading post as well as an important consumption centre.

One vessel from around the mid-6th century has been tentatively identified as a *chytra* (Ugolini and Olive 2006, 30), but unequivocal examples of Mediterranean-type cooking ware from the Greek or Punic world are known only from the 5th century BC onward, and even then still constitute less than 1% of the whole cooking ware set (Ugolini 2000, 398). In the 4th-century BC levels, four *caccabai* and *lopades* rims have been discovered, one of them perhaps Punic (Olive and Ugolini 1997). If Greek or Punic individuals may have settled at the site, owing to its presumed function as a trading post, it looks as if they consumed little imported cooking ware, using instead local indigenous-type products.

Le Moulin (Peyriac-de-Mer, Aude)

Le Moulin may possibly have been occupied during the course of the 6th century BC, but there is clear evidence for settlement there only from the 4th century BC (Fig. 17.1). For the moment, only the pottery from the destruction level of the settlement, dating to around 300 BC, has been studied, showing the predominance of Greek products (Granier 2004, 144). Among these products, which could have been shipped from the Greek colonies of Massalia and Emporion/Ampurias (l'Escala, Girona, Spain), we find several *caccabai*, *lopades* and lids of Greek cooking ware. These forms constitute, for the end of the settlement occupation, about 6% of the individual specimens of pottery and 10% of the individual specimens of table and kitchen ware. They are complemented by a few *caccabai* and *lopades* manufactured in regional wheel-made cooking ware (Curé unpublished). Thus, Le Moulin has yielded the highest concentration of Mediterranean-type cooking ware of any indigenous site studied to date in southern Gaul. In addition, these vessels seem to have been a regular feature of the suite of kitchen ware used at the settlement during the entire period of its occupation. Finally, even though these vessels seem to be of various productions, the recurrent presence of a distinctive fabric appears to show that a significant number of them share the same origin (Curé unpublished).

Spatially, the site's Greek cooking ware is not especially concentrated in any one zone, except for three *lopades* and

a lid discovered in the same area – within and in front of a domestic unit – in the destruction level (Solier and Fabre 1964, 388; 1966, 117). Nevertheless, Greek cooking ware has been found in several domestic units, often in association with other cooking pots of the indigenous repertoire. The combination of the repertoires can be interpreted in various ways; from the coexistence of individuals from different ethnic groups within a domestic unit to the emergence of hybrid cuisines; a cultural mixing at the settlement of Le Moulin is likely to be at the origin of these assemblages.

Pech Maho (Sigean, Aude)

Pech Maho, located less than 5 km south of the settlement of Le Moulin, was occupied between 560 and 200 BC (Fig. 17.1). The economic function of this trading post is particularly explicit. The commercial aspect is illustrated by numerous pottery imports, particularly from the Etruscan, Greek, Iberian and Punic worlds. The discovery of a lead tablet bearing texts in archaic Ionian and Etruscan script and recording a transaction in which Greeks and locals were taking part, confirms the integration of local populations into trade activities at the site (Lejeune *et al.* 1988).

The first fragments of imported cooking ware date to the second half of the 6th century BC, but most of this material is from the end of the site occupation, between 225 and 200 BC. From the Greek world, maybe one *chytra*, some *caccabai* and *lopades* date to this period. From the Punic world, and more precisely from Carthage or its nearby area, we count a few *caccabai* and *lopades*, along with lids. All of these Mediterranean-type products represent 0.7% of the individual specimens of table and kitchen ware. As with most of the sites previously discussed, even if individuals of Greek or Punic origin seem likely to have been present at Pech Maho, we cannot definitively associate these vessels – found in several areas of the settlement – with them.

Discussion and conclusions

The sites presented in this paper are, according to the available archaeological data, the only indigenous settlements of southern Gaul to have yielded undoubtedly Mediterranean-type cooking ware (either entire shapes or fragments of rims). On all of these sites, the presence of individuals from other cultures is plausible, and even likely in many cases. At the colonies of Emporion, Agathe, Massalia and Olbia, Mediterranean-type cooking ware has been found consistently. Though indigenous-type vessels were also used on colonial sites, they represent only a small fraction in the ceramic assemblages. Thus, it appears that the inhabitants of Greek colonies rather consistently cooked

in Mediterranean-type ware, following their own culinary habits. In the case of indigenous settlements, however, we cannot systematically assign imported kitchen ware to outsiders. Repeated contacts among local and external populations may have caused the customs of each group to change, and encouraged a hybridisation of culinary practices. Cultural blending, to which ethnic mixing might be added, forbids us to express any mechanical equation between pot, practice and people. We are invited, instead, to reconsider culinary practices from an angle that allows for change, rather than considering them markers of an ethnic or cultural identity clearly demarcated at a given moment.

The case of the mortar is a good demonstration of this dynamic. This exogenous item, imported and then produced on a regional scale, could have been first adopted and adapted as an aid to wine consumption. This practice, which fits socially, economically and politically into an indigenous scheme, also reflects the integration of Mediterranean traits, such as the use of specific drinking vessels and the addition of aromatic herbs or seasonings to the wine. Subsequently, the use of the mortar might have become standard for daily culinary activities. That would explain why this kind of vessel is widely attested in almost all settlements from the 6th century BC onward, while the presence of Mediterranean-type cooking pots is – on the contrary – rather scarce, and usually limited to coastal sites or presumed trading posts.

With regard to cooking vessels, the complexity of the situations does not allow us to settle the question, and each case seems specific. Does this apparent diversity result from limits imposed by the archaeological data or does it actually reflect different situations? It is likely that the situations of cultural contact experienced at each of these sites engendered a multiplicity of reactions, within which acculturation processes were in no way unidirectional (Vives-Ferrándiz 2008). We saw that individuals of Greek origin living in coastal settlements might have used Greek ware, indigenous ware and even Etruscan ware. Indeed, Etruscan cooking pots are regularly attested in Provence and eastern Languedoc. In particular, Etruscan cooking urns seem as frequent as Greek cooking ware at Massalia during the first half of the 6th century – representing around 2% of the individual items of table and kitchen ware – a period also characterised by a massive use of local hand-made pots (Curià 2000). Even if the presence of Etruscan traders and indigenous people within the colony is plausible, the use of a variety of available cooking pots – whether Greek, Etruscan or local – by the Greek settlers has to be considered as well. As for the indigenous populations, some might have perceptibly modified their eating habits and adopted Mediterranean-type vessels. Though it is hardly possible to answer with certitude

the triple question, “How, why and by whom were these vessels used?”, it is nevertheless clear that the study of these ceramics provides particularly fertile ground upon which to develop considerations of cultural contact and acculturation.

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FORMS OF ADOPTION, ADAPTATION AND RESISTANCE IN THE COOKING WARE REPERTOIRE OF LUCANIA, SOUTH ITALY (8TH–3RD CENTURIES BC)

Alessandro Quercia

Introduction: cooking wares in areas of cultural contacts

As anthropological and archaeological studies have been emphasising in the last 30 years, food is a major part of daily social practices and represents a fertile research field for developing a better knowledge of ancient societies (Goody 1982; Bats 1988; Twiss 2007; Mills 2008; Dietler 2010). In particular, food practices can provide seminal information for processes of cultural transmission in areas of colonial contacts where different social groups and individuals interacted. Recent research emphasises the incorporation of alien food practices into both the everyday and the ritual activities of ancient societies. In particular, some studies have shown how the cultural transmission of food practices in colonial situations was quite complex: such interactions rarely entailed a passive adoption of new culinary habits, but rather demonstrate selective adaptation and transformation of existing household activities. Sometimes there were disagreements over and resistance to the incorporation of exotic food, but this could shift towards self-conscious appropriations in existing cuisine (Dietler 2010, in particular 186–192). In other cases, the food practices that were initially adopted did not continue because of cultural barriers or impediments, or appropriation might be stymied or slowed (Mills 2008, 249). Moreover, some scholars highlight the role of women and intermarriage in the cultural transmission of food practices in areas of colonial encounters (Mills 2008, 252–253; Dietler 2010, 189).

There are many archaeological indicators which carry potential information for understanding of culinary practices in areas of cultural contact: textual and iconographic sources, food processing vessels (*mortaria*, cooking wares), table wares, amphorae and cooking installations, as well as zooarchaeological and archaeobotanical remains and residue analyses. In recent years, some scholars have focused specifically on cooking wares attested in cultural contact areas of the Western Mediterranean, mainly France and Italy. In particular, Michel Bats has emphasised the role of culinary pottery as a cultural marker of resistance and differentiation, as well as an indicator of integration among different societies and communities. On the basis of archaeological and textual evidence, Bats (1988) proposed a culinary model based on food consumption as well as on culinary pottery in the ancient Greek world: he identified a limited repertoire of vessels dedicated to food processing and cooking, which seemed to have had only local variations. Bats also assumed (1994) that instances of prolonged conservatism and rare adoption of Greek-style culinary repertoire by the native communities occurred regularly in Southern France, especially in the Rhone river basin, in contrast to the Greek colonies of Massalia and Olbia. In contrast, he emphasised how the Greek repertoire was assimilated by the indigenous people of Southern Italy from the 4th century BC. More recently, Michael Dietler (2010, 233–242) confirmed that the indigenous groups of Southern France had substantially maintained their hand-made kitchen ware repertoire of Iron Age tradition and only occasionally had adopted Greek forms. In contrast,

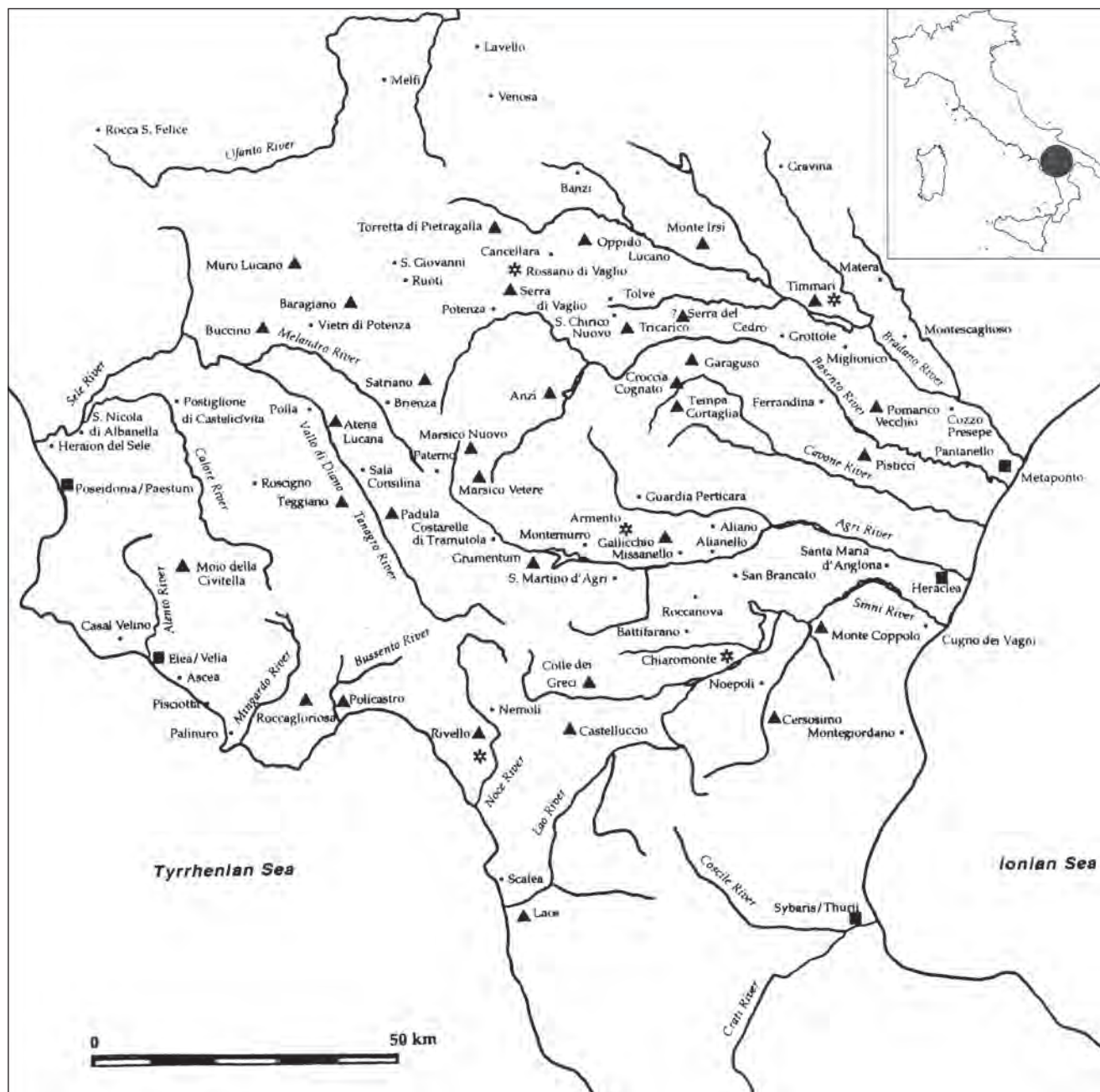


Figure 18.1. Lucania, map of ancient sites. After Isayev 2007, fig. 2. Courtesy of the author.

the first settlers of Massalia seemed to have preferred to adopt indigenous hand-made cooking pots, and only 200 years later, at the beginning of the fourth century BC, did the Greek colony produce its own cooking wares in standard Greek forms (Dietler 2010, 233–234). However, a somewhat different picture is provided by Anne-Marie Curé (this volume): Etruscan cooking pots were presumably used alongside local hand-made vessels in Massalia until the end

of the 6th century BC, when Greek cooking wares began to be widespread in the colony, while only a handful of indigenous coastal sites yielded modest selections of Greek cooking pots. To sum up, the analysis of the cooking wares from Southern France has shown multiple, not unidirectional, reactions and behaviours that reflect changes in cooking and eating habits, as well as the presence of non-local individuals in indigenous settlements.

The aim of this paper is to present a preliminary picture of the use and adoption of cooking pots in Lucania (Fig. 18.1), which represents a paradigmatic example of intense and deep contacts between Greek settlers and indigenous communities in Magna Graecia. Indigenous communities consisted of a series of culturally distinctive groups, which are traditionally identified by the Greek ancient sources as the autochthonous “Oinotrians” and “Chones”, and later as the Lucanians coming from Central Italy. In fact, the archaeological evidence shows a situation that is less schematic and much fuzzier. Unfortunately, the published Lucanian cooking wares are still modest in number, especially for the earliest stages, and the data concerning their archaeological contexts are thin: rarely can they be quantified, making statistical comparisons with other ceramic categories quite difficult. Moreover, the limited environmental data for other indicators of culinary practices mean that it is quite difficult to obtain a comprehensive picture of the food processing habits practised in Lucania: only a few sites such as Incoronata (see below) have useful data of this kind.

This paper will analyse the cooking wares repertoires attested in Lucania from the early contacts between Greeks and indigenous communities until the beginnings of Romanisation: elements of cultural borrowing and exchange and variation in shapes across the cooking ware repertoire will be highlighted. Also, differences between indigenous and Greek assemblages will be observed to see if they can provide evidence of changes in culinary practices. The first part of the paper will be focused on the presentation of the archaeological evidence, while the possible interpretations of the data will be discussed in the final section.

Cooking wares and colonial encounters: the case study of Lucania

In the Bronze and Iron Ages, the indigenous settlements of Lucania are characterised by the presence of hand-made “*impasto*” pottery, a term which is applied to hand-made pottery of coarse fabric, usually made without the use of a potter’s wheel. This ceramic category consisted of shapes with very limited morphological variations and it had a wide geographical distribution, with close relations to the Japigian and Campanian and Sibaritide (Bailo *et al.* 1999) as well. They are multi-functional vessels used also for food processing, but only archaeological associations with cooking facilities such as hearths and fireplaces, or with organic remains and residues, can provide reasonable clues in suggesting an actual cooking function for some shapes.¹ The repertoire was composed of bucket-shaped *situlae* and



Figure 18.2. Incoronata, *chytra* from the settlement, 7th century BC. Pizzo 1992, fig. 198.

ollae of medium and small size used for boiling food (to be distinguished from the bigger examples for storage), thick plates and pans for baking and dry cooking.

From the 8th century BC the hilly area immediately facing the Ionian shore of Lucania was characterised by the presence of settlements where Greek and indigenous groups appear to have coexisted, sharing craft traditions and material culture. This phenomenon occurred clearly before the first Greek *poleis*, such as Metaponto and Siris, were established by Achaian and Ionian newcomers in coastal Lucania from the second half of the 7th century BC. The settlement of Incoronata, located in the territory of the future colony of Metaponto and abandoned shortly before the foundation of the urban site (630 BC), can be considered one of the most obvious examples of such coexistence between “mixed” communities (Carter 2006, 55–78). There, the archaeological evidence shows how this centre was characterised by Greek-style rectangular buildings – called *oikoi* by the excavators – that yielded imported Greek ceramics, such as table ware and *amphorae*, and local imitations, as well as indigenous “*impasto*” and matt-painted wares.

Within the ceramic assemblage from this site we can also observe the introduction of a small quantity of cooking pots morphologically related to the Greek repertoire. In fact, some buildings discovered in Incoronata contained *chytrai* (Fig. 18.2), cooking pots with single or double handles which belong to the Greek repertoire.² Sometimes, cylindrical pierced terracotta objects interpreted as cooking stands

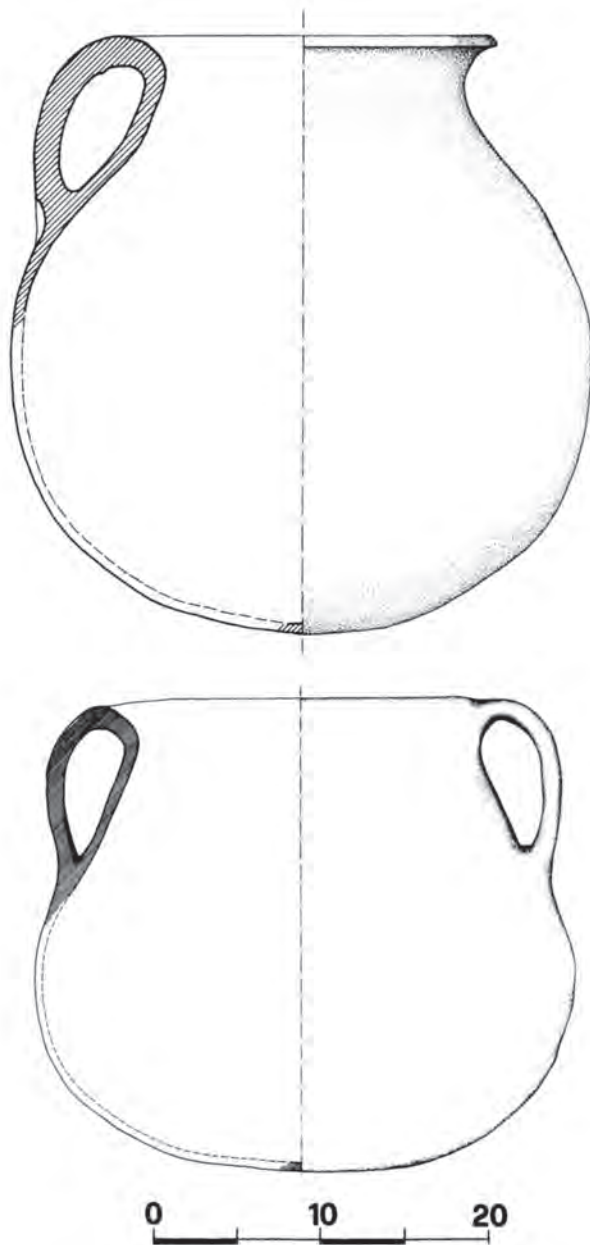


Figure 18.3. Siris, *chytrai* from the necropolis, 7th century BC. Berlingò 2007, fig. 18, nos. 36, 43.

for *chytrai* – i.e. *lasana* – were found associated with the same contexts as the cooking pots (Castoldi 1995, 110–111). In particular, cooking wares from *oikos* E, which was inhabited in the first half of the 7th century BC, made up 10% of the overall assemblage. It is noteworthy that the cooking ware assemblage of this building is composed equally of *chytrai* and “impasto” vessels belonging to the indigenous repertoire – three individuals per class of materials (Lambrugo 2003a, 54–57). The Greek cooking

pots were therefore found in association with indigenous kitchen wares in the *oikos*. Similar *chytrai* were discovered sporadically in other contemporary contexts of what would become the Metapontine city, such as that found in “Andrisani” locality and associated with a cooking hearth (De Siena 1986, 203, pl. 68).

Another key site where early Greek *chytrai* occur is the area of the nearby Greek colony of Siris (Fig. 18.3), located in modern Policoro. In particular, complete specimens³ were documented in several tombs of the western necropolis of Siris, which is dated to the early Archaic phase (700–630 BC) and they were associated with Corinthian, East Greek wares and indigenous impasto *situlae* (Berlingò 2007, 376–379). The presence of different patterns of burials was interpreted by the excavators as an indication of the coexistence of Greek and indigenous groups. Other sporadic fragments unearthed in household contexts (Haensel 1973, 446, fig. 27.1; Tagliente 1986, 130, pl. 29) confirmed the presence of early Archaic cooking pots in Ionian Siris.

The lack of archaeometric analysis does not allow us to confirm whether the *chytrai* from Incoronata, Metaponto-Andrisani and Siris were imported or produced locally. A provenance from Corinth and other Greek areas (Aegina, Rhodes, Cyclades) was suggested by the excavators only on the basis of the typological parallels.⁴ Other *chytrai* attested in early Archaic contexts of Southern Italy, such as the examples from the necropolis of Mylai in Sicily (Bernabò Brea and Cavalier 1959, 114–115, pls. 53–55) and those from Taranto (Lo Porto 1959–1960, 30, fig. 21) have been assumed to be Greek imports.⁵

On the basis of this evidence, we can assume that a small number of cooking pots came from the Aegean to Southern Italy during the early 7th century BC, before the settlement of the Greek *poleis*. It is notable that only Greek-style deep pots for boiling liquid and semi-liquid food were documented in Incoronata, while frying pans and shallow casseroles appear only among the impasto vessels. The presence of seed remains (barley, emmer and fava bean) in other contexts of the Incoronata hinterland (Carter 2006, 78), as well as the frequent appearance of saddle-querns in the *oikoi* (Castoldi 1995, 110; Lambrugo 2003a, 55, fig. 14) is a further indication of the preparation of cereals and legumes in soups or stews, even though bread and cakes were also likely to have been produced.

The Greek *poleis* of Lucania and South Italy emerged as fully urban settlements in the 6th and 5th centuries BC. At this stage, all the main vessels belonging to the Greek *batterie de cuisine* appeared in the repertoire used by Western Greeks. One of the contexts with the best potential information is the *Kerameikos* of Metaponto, a ceramic workshop complex which was active from the Archaic age onward for three centuries and manufactured

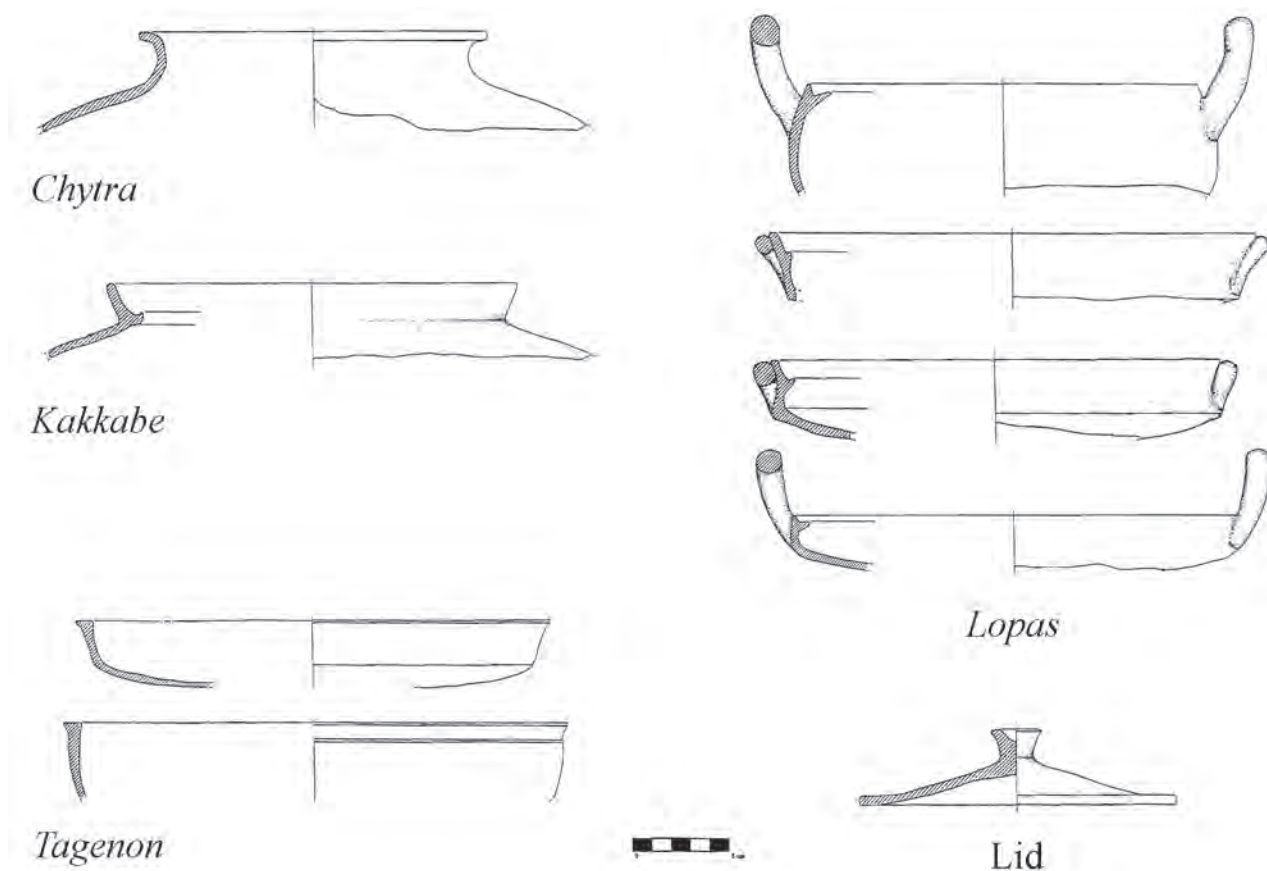


Figure 18.4. Metaponto, *Kerameikos*, cooking ware repertoire from kiln dump, 4th century BC. After Quercia 2004, 179–188, figs. 2, 4–7.

cooking ware (Fig. 18.4) alongside other ceramic wares, primarily table wares and other food processing vessels (mixing bowls, *mortaria*)⁶. In the second half of the 6th century BC there is no clear evidence of cooking ware production in Metaponto, since the kiln dumps provided only occasional fragments of *chytrai* (1.6% of the overall assemblage). Wear traces on these fragments suggest they were not kiln wasters; nevertheless a local production of these artefacts is likely. From the 5th century BC cooking ware was widely produced in the *Kerameikos*, representing 16% of the overall assemblage. The main shape was still the *chytra*, but a new form appeared, the *kakkabe*. This is a wide-mouthed and lidded form, which was identified by some scholars as a culinary vessel documented by ancient Greek textual sources (Bats 1988, 46–48). The *lopas*, a shallow and handy vessel used for stewing food (especially fish), was already documented in the 5th century BC, but it became the best-attested cooking pot produced in Metaponto from the first half of the 4th century BC.

On the basis of the meagre data available for the 6th and 5th centuries BC, the Greek cooking ware repertoire was not fully adopted by the indigenous communities, unlike

other ceramic categories, such as drinking vessels for wine, which were imported by the Greek colonies or imitated locally (Pontrandolfo 1995). In the Archaic contexts of Satriano, an important inland site located in the Basento river valley, impasto wares appear to have remained the only vessels used for processing food in association with hearths and cooking stands (Garaffa and Vullo 2009), as well as in Roccagloriosa (Gualtieri *et al.* 1990, 221–223, fig. 175). Occasionally, cooking wares belonging to the Greek repertoire seem to be documented only in sites quite close to the Metapontine chora, such as Cozzo Presepe, where some fragments of *chytrai*, *kakkabai* and *lopades*⁷ were present in the Archaic assemblages alongside the much more abundant indigenous impasto. A similar situation seems to be attested in Southern France, where only few Greek cooking vessels were occasionally imported at indigenous sites in the vicinity of Massalia, such as Lattes and Saint Blaise (Dietler 2010, 239; Curé this volume).

From the end of the 5th century BC the indigenous communities of this area, which the ancient literary sources identify (not necessarily entirely correctly) as the Lucanians, acquired a strong sense of “ethnic identity”:

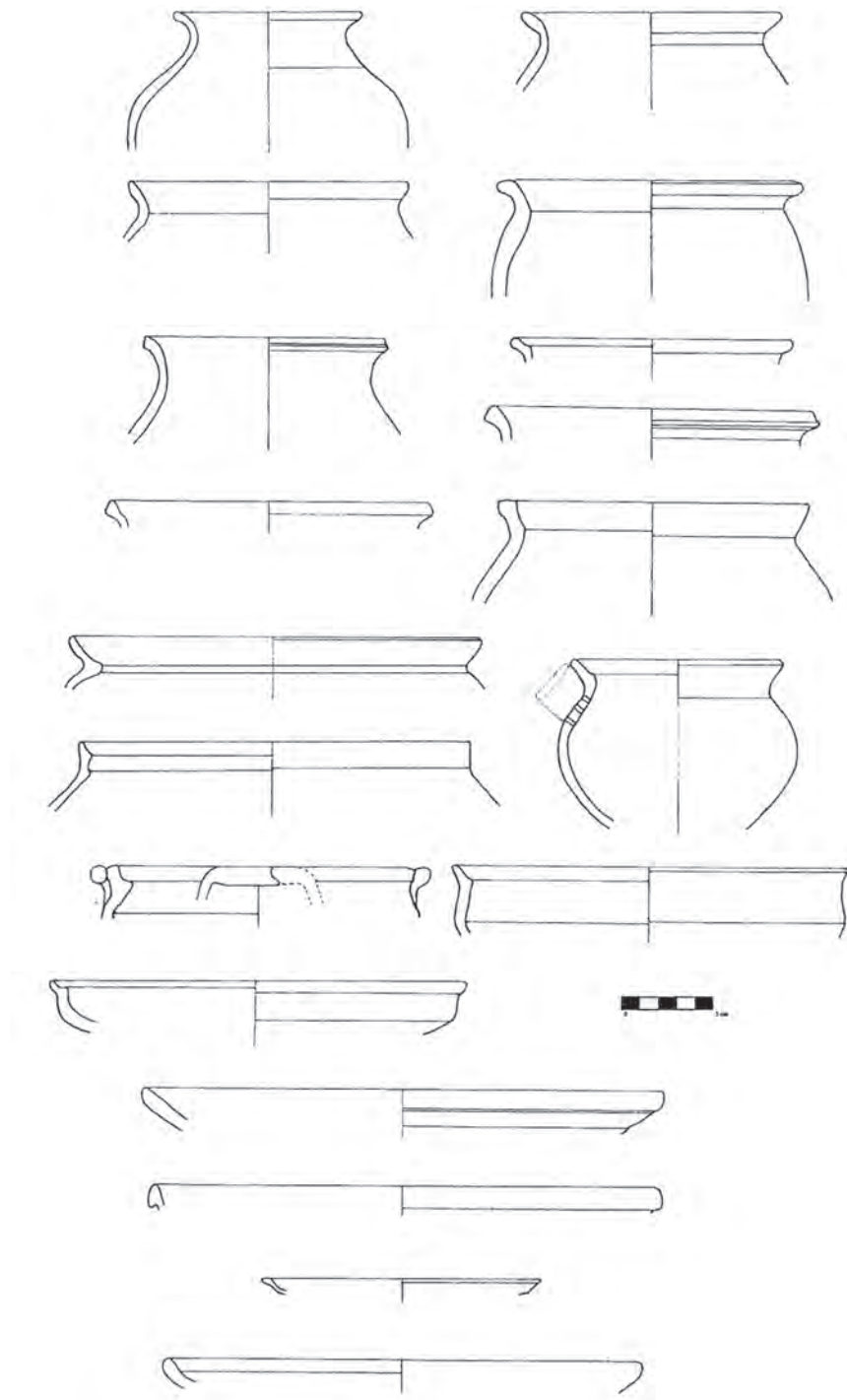


Figure 18.5. Torre di Satriano, cooking ware assemblage from the cult place. After Rinaldi 2005, pls. 23–25.

they renewed former centres and established fortified settlements, affecting the political stability of the Greek towns. Actually, the “Lucanians” were the result of a long gradual process of transforming different indigenous groups in which the component from Central Italy was

only a part (Pontrandolfo Greco 1982, 123–125). Moreover, it is important to point out that in this phase it is quite hazardous to attempt to distinguish Greek and indigenous sharply in “ethnic” terms, since “mixed” communities seem to have developed in Lucania, as the recent archaeological

research in Metaponto's countryside is showing (Carter 2006, 230–232; Carter and Prieto 2011).

At this stage, it seems that full adoption of the Greek culinary repertoire by indigenous communities took place from the 4th century BC. The cooking ware repertoire coming from the most investigated and best-published Lucanian sites, such as Cozzo Presepe (du Plat Taylor *et al.* 1983, 375–379), Pomarico (Bianco *et al.* 1997, 186–192), Tricarico (Caravelli 2008), Laos (Munzi 1999) and Roccagloriosa (Gualtieri *et al.* 1990, 262–273), is fully consistent with the main vessels in the *batterie de cuisine* of the Greek communities of Metaponto and Magna Graecia more widely. The use of this repertoire is not only attested in settlements but also in Lucanian cult places, as in the case of the sanctuary of Satriano (Rinaldi 2005; Fig. 18.5). The impasto pottery no longer seems to be widely used except in rare cases, such as the large pans for baking and cooking by dry heat documented in some sites (*i.e.* Cozzo Presepe).

The meagre data do not allow us to determine whether the cooking wares from indigenous sites were produced locally or imported from the Greek colonies. Sporadic archaeometric analysis and the identification of some workshops with kiln wasters consistent with cooking vessels, as in Roccagloriosa (Gualtieri *et al.* 1990, 275, fig. 188, nos. 321, 326–327) suggest that cooking wares copying the Greek repertoire were manufactured in some indigenous settlements; however, imports from the Greek coastal towns (Metaponto, Heraclea) cannot be ruled out. In this regard, it can also be observed that some types appear to be peculiar to the Lucanian area, such as the *lopas* with curvilinear profile and vertical rim produced in the *Kerameikos* of Metaponto (Quercia 2004, 183–185, 194 type C1; see Fig. 18.4, first *lopas* from the top), morphologically close to specimens from sites immediately beyond the Metapontine countryside (full references in Quercia 2004) and more sporadically in the Lucanian hinterland (Caravelli 2008, fig. 328, no. 939). Only archaeometrical analysis will clarify whether they were Metapontine imports or locally produced.

From the end of the 4th century BC, Southern Italy began to be affected by the cultural and political influence of the Roman Republic. In particular, Lucania, alongside Apulia, was one of the earliest regions that came into contact with the Roman sphere through alliances with the indigenous communities and elites, military interventions and the foundation of the *colonia latina* of Venusia (291 BC). It is, therefore, probably not coincidental that some vessels morphologically consistent with the Central Italic and Roman cooking ware repertoire were introduced in the Lucanian assemblages at this time, alongside the kitchen ware of Greek tradition: the *olla*, the *patina* and the *clibanus*. The *olla* with out-turned rim and flat base (Fig. 18.6) was the main cooking pot in Etruria and Latium from the Archaic

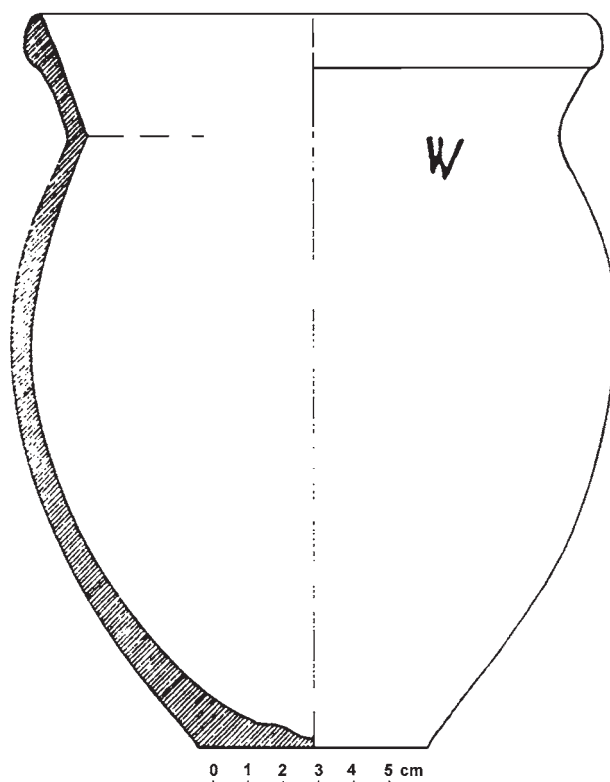


Figure 18.6. Rome, *olla*, end of 4th century BC. Bats 1988, fig. 12.2.

period to the Late Republican Roman age (Bats 1988, 65–67) and it occurred commonly in Lucanian communities at least from the early 3rd century BC. Moreover, this is the best-attested cooking vessel in the sites of Satriano (Rinaldi 2005, 224–225) and Tricarico (Caravelli 2008, 491–500) in this period. Also, the *patina* with flat base documented from the 3rd century BC in Central Italy (Bats 1988, 69, fig. 13, nos. 6 and 10) has close parallels with some *lopadēs* attested at the site of Tricarico from the second half of the 3rd century BC (Caravelli 2008, 507–508, nos. 960–965; Fig. 18.7). Unlike the Roman examples, the Lucanian ones still retain the handle and represent an intermediate version. Finally, the *clibanus*, or *testum*, is a cooking device most likely used for baking or to reheat food: hot coals and ashes were probably put against the upper wall of the vessel (Fig. 18.8). Although it is known in Greece, *i.e.* in Athens (Sparkes 1962, 128, pl. 4.2), and in Etruria (Scheffer 1981, 107–108) as well in the Archaic and Classical periods, the form attested later in Central and Southern Italy has clear morphological differences and it does not often appear in the ceramic repertoire of the Western Greek colonies. The type with projecting flange is well attested in Lucanian sites⁸ and in Greek towns under Lucanian rule,⁹ as well as in neighbouring Apulian settlements, such as Gravina di Puglia and Monte Sannace.¹⁰ The type could be compared

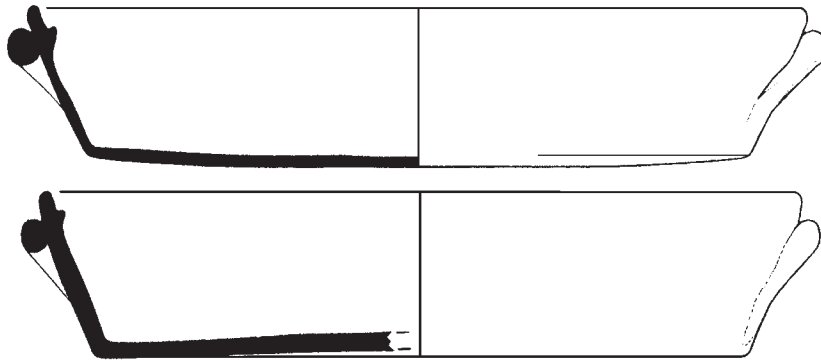


Figure 18.7. Civita di Tricarico, *lopades* with flat bases, second half of 3rd century BC. Caravelli 2008, fig. 330, nos. 960 and 962.

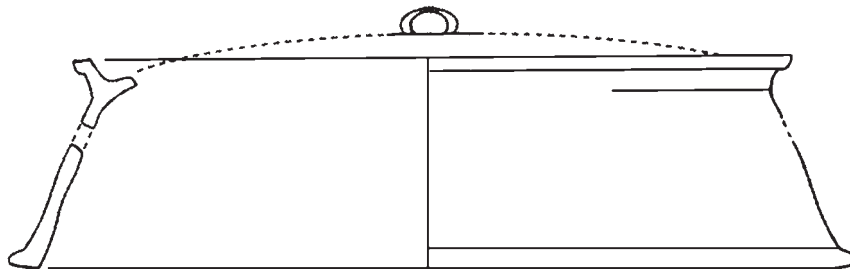


Figure 18.8. Laos, *clibanus*, 3rd century BC. Munzi 1999, pl. 46.

to similar specimens attested in Central Italic mid- and Late-Republican contexts (Cubberley *et al.* 1988, fig. 1). The presence of these forms in the Lucanian repertoire could be interpreted in relation to the progressing Roman presence in the area from the first decades of the 3rd century BC and the corresponding introduction of some vessels from the Roman *batterie de cuisine*.

Discussion and conclusion

From this picture, we can observe that different cooking ware repertoires were attested in Lucania and that the indigenous communities of Lucania took different selective approaches towards the adoption of Greek and Roman cooking ware repertoires, which changed over time.

Firstly, Greek cooking pots are attested in Southern Italy from the early 7th century BC, before the full establishment of the Greek *poleis*. Their modest quantity, limited to the shape of the *chytra*, does not allow us to determine the full scope of their use and the real impact they had in the early introduction of new culinary habits and food practices in the indigenous communities of Southern Italy: for that, we cannot go beyond mere hypothesis. It is still unclear whether there was an intentional trade of these *chytrai* from Greece or whether they were carried in

ships, either as ballast or (more probably) for the use of sailors and passengers, given their small quantity; it is also possible that they were brought by the newcomers as part of their household equipment. Another question is how to explain the presence of local cooking ware alongside Greek cooking vessels in some contexts, such as at Incoronata. Along the lines of what others have proposed in other locations (Mills 2008, 252–253), it has been suggested that the use of impasto vessels at the site might indicate the active presence of indigenous women (Lambrugo 2003a, 55), as in the case of Massalia mentioned above (Dietler 2010, 253). However, Greek newcomers could have also used local vessels, so that the indigenous vessels fulfilled the same function as *chytrai*. To sum up, the coexistence of Greek cooking pots and impasto pottery could be evidence of modes of reciprocal interactions and contacts between culturally different groups, but the evidence is still too meagre to be certain about the precise details of the adoption of new food processing practices and culinary habits.

In the Archaic and Classical phases, when the production of Greek cooking pots is attested in the urban workshops of Metaponto, the indigenous communities seem to display a conservative “resistance” towards Greek kitchen ware and mostly continue to use the impasto kitchen repertoire of the Iron Age. The available evidence is again too little

to provide a clear picture: however, it can be observed that Greek cooking wares appear only at few sites in the Metapontine hinterland (*i.e.* Cozzo Presepe) and they do not seem to have penetrated the indigenous settlements along the river valleys inland (Satriano, Roccagloriosa).

In the 4th century BC the Lucanians controlled much of the territory. At this stage, the indigenous communities fully adopted the Greek *batterie de cuisine* (as already highlighted by Bats 1994) and they produced local imitations of the Greek cooking vessels. Simultaneously, a decrease in the use of impasto pottery in the kitchen ware repertoire appears to be evident. This pattern most likely reflects social and cultural choices that are consistent with a wider picture. The Lucanian communities acquired various elements of Greek material culture and customs, such as, for instance, black glazed table ware and the consumption of wine, and they seem to have been fully integrated into a relatively homogeneous South Italian material cultural tradition at this stage. However, such adoption is not passive but triggered by a selective attitude on the part of indigenous communities, so that they accept some elements and reject others. With regard to the cooking vessels, this full adoption could perhaps indicate changes of culinary habits by the Lucanian communities, but this must be supported by the integrated analysis of other aspects of and evidence for food practices.

Finally, we can also observe the presence of vessels likely to be consistent with the Romano-Italic repertoire within the Lucanian *batterie de cuisine*: the adoption of these forms by the Lucanian communities occurred very early, perhaps before the Roman control of the area. The possible reasons for and mechanisms of such integration are still obscure; the presence of Central Italic individuals who brought their own culinary habits to the Lucanian sites is possible, but the evidence is still inadequate.

Despite the complexity of the subject and the necessity for an integrated analysis of the numerous archaeological indicators related to the food practices, nevertheless the study of cooking wares from Lucania can indicate some important trends and document probable changes in cultural habits and cuisine over time, which can be usefully developed in conjunction with further evidence in the future.

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Notes

- 1 On the role of the archaeological context and the organic remains for a more precise identification of “impasto” vessels, see Bietti Sestieri *et al.* 2002 and Recchia 2004.
- 2 Pizzo 1992; Pizzo 1995; Stea 1997, 77–78, figs. 93–96; Lambrugo 2003b, 74.
- 3 The *chytrai* were used as burial containers: Berlingò 2007, 377, cat. nos. 11, 12, 20, 27, 35, 36, 43, 54, figs. 10.11–12, 16.27, 18.35–36 and 43.
- 4 The cooking ware from Inconronata was mainly hypothesised as a “ceramica di fabbrica coloniale” even if a Corinthian production was not completely ruled out (Lambrugo 2003b, 74). Berlingò (2007, 377) assumed that the cooking pots discovered in the western necropolis of Siris were mainly produced in the Eastern Greek area and some of them were thought to come from the Cyclades or to be based on Rhodian prototypes.
- 5 A Greek-style cooking pot is attested also in an early 7th-century BC tomb from the indigenous site of Francavilla Marittima: the specimen is interpreted by the excavator as an “olla indigena” (Kleibrink 2010, 59, fig. 60).
- 6 The *Kerameikos* is being analysed by Silvestrelli (forthcoming). On the cooking ware from a 4th-century BC kiln dump in the same workshop complex, see Quercia 2004.
- 7 du Plat Taylor *et al.* 1983, 375–377, cat. nos. 440, 441, 451, 459, 460, 463, 464, figs. 145–147.
- 8 Caravelli 2008, 508–510, nos. 972–991 (Tricarico); Rinaldi 2005, 227, pl. 25.79–80 (Satriano); Small 1977, 133, fig. 30, no. 181 (Monte Irsi).
- 9 Cipriani *et al.* 1996, 269, no. 243 (from Poseidonia); Munzi 1999, 94, pl. 46 (from Laos).
- 10 See references in Cubberley *et al.* 1988.

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POTS AND BONES: CUISINE IN ROMAN TUSCANY – THE EXAMPLE OF IL MONTE

Günther Schörner

Introduction

In his ground-breaking book *Cooking, Cuisine and Class*, Jack Goody (1982) discerns four main phases of cooking: production, distribution, preparation and consumption of food, and the material culture associated with each. Following this approach, many anthropological studies have shown that food is an integral part of cultural identity.¹ Thus it is important to consider the significance of food processing and cooking in the construction of identity in the Roman era, especially in a context of changing social and political conditions after integration of conquered regions into the Roman Empire. This is true not only for all the provinces under Roman rule, but also for the regions of Italy itself. The cuisine of Roman Britain has been thoroughly studied, both by establishing theoretical frameworks and by examining many sites in a holistic approach,² but the situation in Italy is very different. Apicius' *The Art of Cooking* (translation: Grocock and Grainger 2006) is still used as the main source for Roman-Italic cuisine.³

In contrast, the following observations on foodways in Roman Etruria are based not on literary sources, but on an archaeological case study. They focus on the processes of production and consumption of food in a rural context by integrating the analysis of different categories of material culture, especially animal remains and pottery, in order to compare and contrast these results with the ancient Etruscan and contemporary Roman urban dietary repertoire and eating habits.⁴

Case study of Il Monte

The case study is the site of Il Monte, in the vicinity of present-day San Gimignano in Northern Tuscany. Il Monte is located approximately 10 km northwest of San Gimignano on a slight slope looking to the southeast (Schörner 2008; Schörner 2011). The site forms part of a huge field used for the cultivation of wheat or forage crops. In 2006 we started excavations, investigating a number of trenches and larger areas.

In the southern half of the site are structures including a small house and paving constructed out of small stones, both to a certain extent destroyed by modern ploughing. In the northern part we found a large amount of pottery of different kinds and tiles, forming a massive stratum of discarded material. Apart from local utilitarian wares, a wide range of regional and imported fine wares were detected, from black glazed pottery, to Italian and South Gallic *terra sigillata*, to African Chiara A. These fine wares suggest an occupation history of Il Monte from the 2nd century BC until the 3rd century AD. The site formation processes analysed so far do not allow a more precise chronological differentiation, but the discard layer offers excellent insights into the ceramic assemblage and pottery use of a rural settlement in the Republican and Imperial era in Northern Tuscany.

Cooking: pottery

The starting point for our analysis is the coarse and common wares – *ceramica grezza e comune* in Italian – mainly

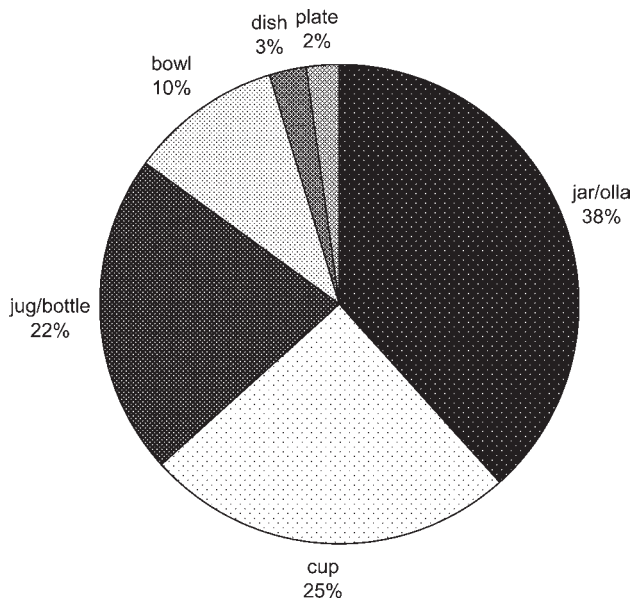


Figure 19.1. Distribution of vessel forms: Area 2 (contexts of a simple house), Il Monte 2007. Chart G. Schörner.

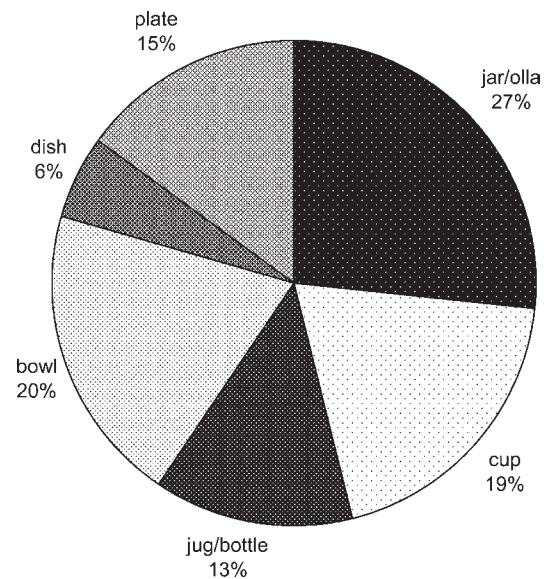


Figure 19.2. Distribution of vessel forms: Area 9 (probably discards of a high status building), Il Monte 2009. Chart G. Schörner.

used for cooking and, on a limited scale, for storing and serving food.⁵ The main approach is quantitative, using the EVE method (Estimated Vessel Equivalent) to calculate the frequency of the occurrence of different vessel forms.⁶ The finds of two areas have been analysed so far: Area 2, excavated in 2007 with the remains of a simple house (Fig. 19.1); and Area 9, excavated in 2009 and 2010 with discarded material of a higher-status building (Fig. 19.2).⁷

In both cases the largest single group was the jar, the *olla* or *aula* in Latin (Figs. 19.1–19.2).⁸ This form has a rim diameter smaller than that of the shoulder, a rounded body and a flat base. Normally handles are lacking. *Ollae* were mainly used for cooking, especially for boiling pulses/porridges, meat and vegetables, but could also have a secondary function of serving and storing of liquid and solid foodstuffs.⁹ At Il Monte many of the sherds are sooted, suggesting that they were exposed to fire and used for cooking.

Further coarse ware and common ware forms were bowls, lids and vessels such as cups, bottles and plates used for serving and consuming food at the table. Most of the vessels should be attributed to local production. They clearly belong to several fabrics, which were produced in different workshops, although the identification and characterisation of these local fabrics is still in progress. The most significant imported ware for cooking is African cookware, which makes up a large proportion of the dishes (Shapes Hayes 3 and Hayes 18).¹⁰ These vessels, together with Internal Red-Slip casseroles of Italian provenance,¹¹ hint at the preparation of Roman-type meals such as

patina.¹² The main difference between the two areas is the higher share of both plates and bowls in the assemblage excavated in 2009/2010, while the ratio of jugs is lower (Fig. 19.2). Whether these variances are due to differences of status, or simply chronology, could not be determined. *Ollae*, however, remain the most important vessel shape, indicating their importance and popularity in different social contexts of the site “Il Monte”.

The main difficulty in contrasting the results of the excavations at Il Monte with those of other sites is to find well-documented excavations and reports with quantified data.¹³

The excavation at Filattiera Soriano, a farmstead of late Republican and early Imperial date near the road from Luni to Parma in the Appennines, yielded a slightly differing ceramic assemblage (Giannichedda 1998; Giannichedda 2005, 397–402). Here *ollae* remain the only vessels for preparing food. Enrico Giannichedda therefore concluded that tradition lived on here and the importation of specialised cooking wares was avoided (Giannichedda 2005, 399).

But which tradition? Smaller rural settlements of the Etruscan period are remarkably under-investigated. One of the best-excavated and documented sites in the agrarian sphere is Podere Tartuchino, an Etruscan farm near Semproniano in the province of Grosseto (Perkins and Attolini 1992). The excavation results indicate occupation from the late 6th to the late 4th century BC, in the period before Roman rule was established. The distribution of utilitarian ware forms is clear-cut (Fig. 19.3): jars were

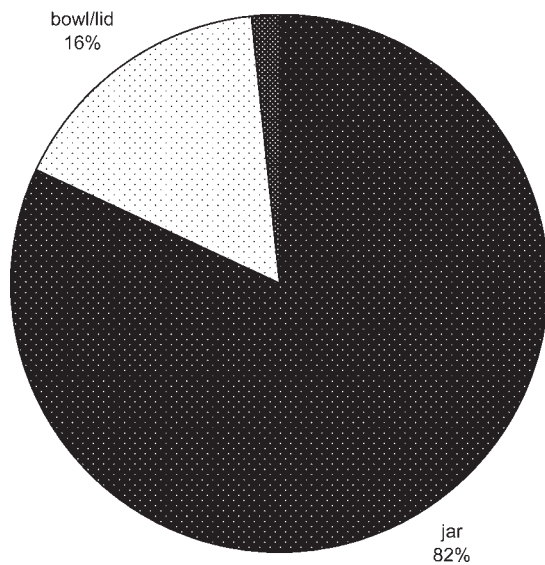


Figure 19.3. Distribution of vessel forms: Podere Tartuchino. After Perkins and Attolini 1991.

by far the most common vessels. As Phil Perkins states, these were used for both cooking and storage: as at Il Monte, quite large numbers of sherds were blackened on the exterior, which is best explained through exposure to fire during the cooking process.¹⁴ Most vessels are sooted on the lower part of the body, implying that they were placed next to the fire.

In comparison to the proportions of forms at other sites, several features typical for Il Monte are conspicuous:

- *Ollae* remain the most common vessels. Thus the relatively large proportion of *ollae* at Il Monte could be interpreted as the perpetuation of traditional cooking techniques.
- The share of *ollae*, however, diminishes from over 80% (Podere Tartuchino) to slightly under 60% (Il Monte) in favour of using imported ceramic classes like African cook ware. The share of *ollae* could be seen as dependent on social status, but this could be fully confirmed only through further studies with more precisely dated contexts.

As a first result, we can conclude that there was a strong tradition of preparing food by cooking in *ollae*. The extent to which the inhabitants adhered to these long-established culinary techniques may vary, as the example of Filatierra Soriano has shown. The people of Il Monte – or at least a group of them – were willing to adopt/adapt other methods and to try new dishes, as the use of African cookware shows.

Table 19.1. Bone ratios of the main domestic animals recorded at different Imperial sites in Central Italy.

	n	Pig %	Ox %	Sheep/goat %
Monte	246	44.7	30.5	24.8
Pistoia	102	44.1	31.4	24.5
San Potito	239	50.6	25.1	24.3
Le Colonne	508	48.7	22.6	28.7
Luni	106	38.7	37.7	23.6
Settefinestre	1518	70.0	13.0	17.0
Ostia	120	71.7	0.8	27.5
Rome	139	77.7	7.9	14.4

Cooking: meat

The only food for which sufficient archaeological data is available to permit comparison of different sites is meat, as bone counts are documented in a number of excavation reports. Although Gillian Hawkes pleads for studies on how the meat was butchered and which parts of the animals were eaten, due to the lack of adequate data we have had to concentrate on the proportions of the three main meat sources – ox, pig and sheep/goat – at different types of settlements (Hawkes 2001, 98; Table 19.1).

At Il Monte pig bones are prevalent, indicating the popularity of pork. Cattle bones are not so frequent, but taking into account the size of the animal, beef was probably the most common meat consumed. Mutton was rather uncommon, judging from both the bone numbers and the yield of meat from an individual animal.¹⁵

Almost identical animal bone proportions have been recorded at the excavations at Pistoia, a late Republican–Imperial site 50 km from Il Monte. It is defined by the excavators as a rural settlement of medium status (Giorgetti and Campodoni 1985; Fig. 19.4). Thus the close resemblance of bone proportions is not surprising, as the sites are similar both in chronological, regional and probably also in social terms.

Other Roman sites are closely related, too, especially those in northern central Italy, as the bone assemblages from San Potito (Bökönyi 1986), Le Colonne (King 1999, 192) and Luni (Barker 1977) demonstrate. San Potito and Le Colonne are villas, and Luni is a Roman *colonia* on the coast; the bones come from Republican contexts. All the sites are characterised by a proportion of pig bones between 40 and 50%, cattle bones constituting 25 to 40% and sheep/goat bones in the range of 20+%. Apart from pork, beef was the most valuable meat, and maybe even the most commonly eaten. Only Le Colonne varies slightly because of the greater share of sheep/goat bones. Evidently the bone assemblages from Settefinestre (King 1985), Ostia¹⁶ and Rome¹⁷ differ considerably, with high to extremely high numbers of pig bones indicating pork consumption.

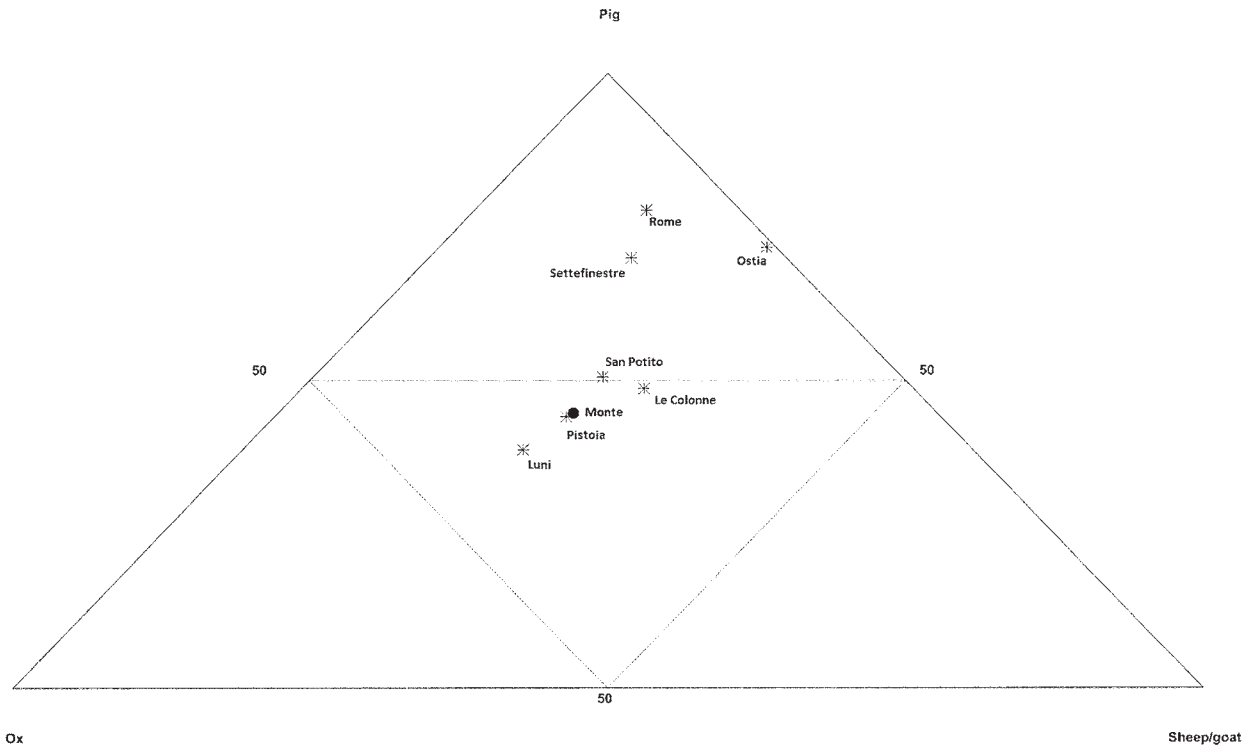


Figure 19.4. Ternary diagram comparing composition of Roman animal bone assemblages in central Italy. Diagram G. Schörner.

Table 19.2. Bone ratios of the main domestic animals recorded at different Etruscan sites.

	n	Pig %	Ox %	Sheep/goat %
Monte	246	44.7	30.5	24.8
Acquarossa	78	20.5	47.4	32.1
Cerveteri	472	28.6	37.1	34.3
Bolsena	1093	37.8	12.3	50.0
San Giovenale	280	22.1	62.1	15.7
Tarquinia I	392	49.2	17.1	33.7
Tarquinia II	85	41.2	27.1	31.8
Roselle	140	41.4	30.0	28.6

It is well known that the Romans were fond of pork; most of the recipes in Apicius' book are dedicated to the preparation of this kind of meat (MacKinnon 2001, 649). This typical Roman dietary repertoire, with an extreme predominance of pork, was not exported, neither to the provinces like Britain nor to the Italian *regiones*. Instead, in the areas of the Rivers Po and Arno a northern central Italian pattern emerges that is only to some extent dependent on the type and status of the site (King 1999, 171–172). It is open to question, however, to what extent this pattern goes back to pre-Roman, mainly Etruscan, food preferences or was influenced by these (Table 19.2).

Analysing the bone assemblages of Etruscan sites, several aspects are evident¹⁸ (Fig. 19.5):

- Only two other sites, Complex Tarquinia II (Bedini 1997, esp. 105–106) and Roselle (Corridi 1989), show bone ratios closely comparable to Il Monte.
- The differences between the sites are much larger than in Roman times. There is no equivalent to the sites of Il Monte, San Potito, Pistoia and Luni clustering around equal values.
- Pig bones figure less prominently; most dots are nearer to the ox or sheep/goat maxima.

The influence of Roman foodways would seem to be an obvious explanation for the increased pork consumption at Il Monte. The case of Roselle, however, advises caution, because the two excavations that have been zooarchaeologically evaluated, scavo Donati and scavo Cygielman, both in 6th-century BC strata, show equal numbers of pig bones and resemble that of Il Monte several centuries later (Corridi 1989). Still more puzzling is the evidence from Tarquinia. Here the peak of *sus scrofa* remains falls in the 6th and 5th centuries BC, amounting to half of all animal bones, declining in the 4th and 3rd centuries to a share of 40% (Bedini 1997, 105–106). The equation “the more pig bones the more Roman” does not hold true. Evidently more factors have to be taken into consideration. To gain a clearer picture more studies on Etruscan settlements, especially in the Volterranean area, would be most helpful.

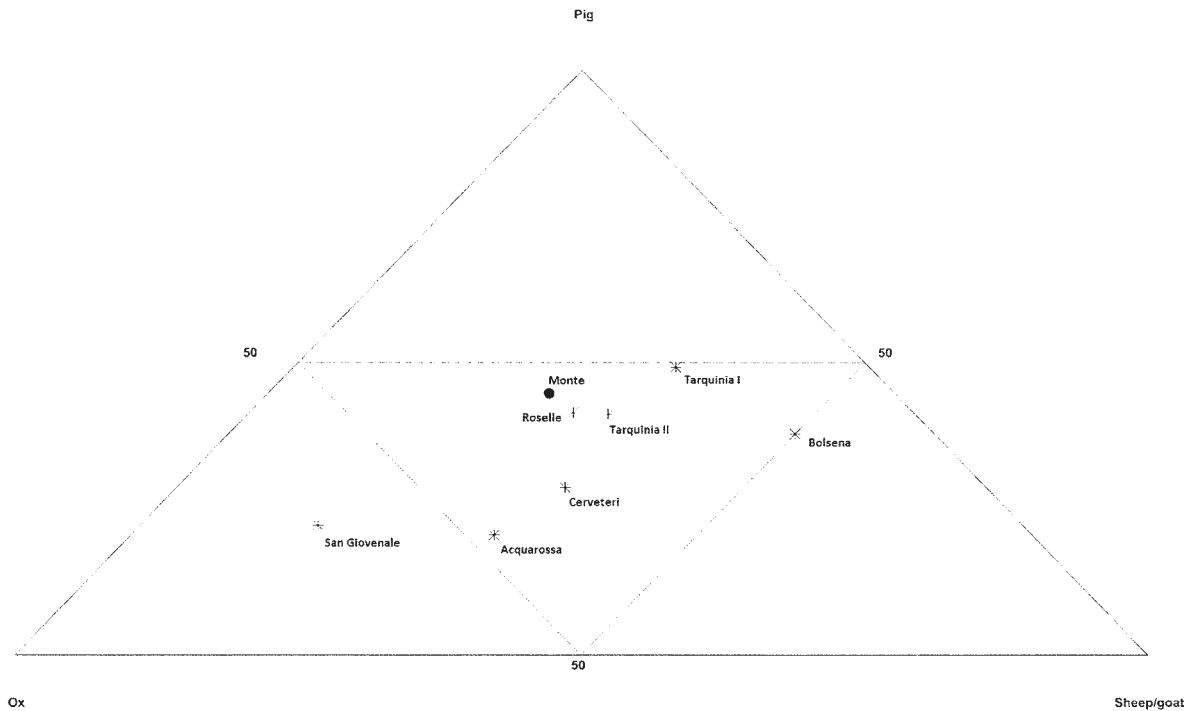


Figure 19.5. Ternary diagram comparing composition of Etruscan animal bone assemblages and that of Il Monte. Diagram G. Schörner.

Serving food

The ways in which Etruscan cuisine differs from the typical Roman-style practices of eating and drinking become still more obvious when we look at how food was consumed. Apart from locally produced table ware, *terra sigillata* produced in Italy was the ceramic class mainly used for serving food on the table (Ettlinger 1990; Medri 1992; Oxé and Comfort 2000; Medri 2005; Menchelli 2005). Despite its rural character, Il Monte was well equipped with Samian pottery, showing a wide gamut of different vessel forms.

Based on the data provided by Giorgio Rizzo in his book *Instrumenta Urbis*, we are able to compare the quantities of the different *terra sigillata* shapes found at Rome with those at Il Monte and therefore examine the contrasting popularity of their usage (Rizzo 2003, 72–98; Fig. 19.6).

The most significant difference between the *terra sigillata* assemblages at Rome and Monte lies in the frequency with which the shape Dragendorff 29 is attested (shape: see Medri 1992, 41–42). This large bowl, the most impressive vessel type of late Italian *terra sigillata* production at Pisa, with a rim diameter up to 50 cm and more, is frequent at Il Monte. These impressive pots must have been used for communal serving. The smaller *terra sigillata* pots are too few in number to allow for Dragendorff 29 bowls having been the sole vessels for serving.¹⁹ Conversely, the

Conspectus form 3 dish, one of the most common types at Rome, is significantly under-represented at Il Monte.²⁰ In general plates and dishes are much more common in Roman contexts than at Il Monte.

These differing assemblages imply a difference in the way food was served and probably different food in general.²¹ Large, deep bowls such as Dragendorff 29 and the common *ollae* were probably used for more liquid dishes, like stews, and the very shallow plates for drier dishes. Because the bones found at Il Monte stem from older, tougher animals it could be presumed that water-based boiling in *ollae* was more appropriate than the drier cooking in *patina* (Ghisleni *et al.* 2011, 112). One further point could be made: because these differences were detected by analysing the assemblages of *terra sigillata*, a class of imported pottery, not locally made table ware, it seems to be especially the higher-status items of material culture that reflect discrepancies in food consumption between rural settlements and Rome.

Conclusion

The situation at Il Monte is comparable to that of other sites in a provincial setting, like the northwestern provinces of the Roman Empire. More than 20 years ago M. L. Okun

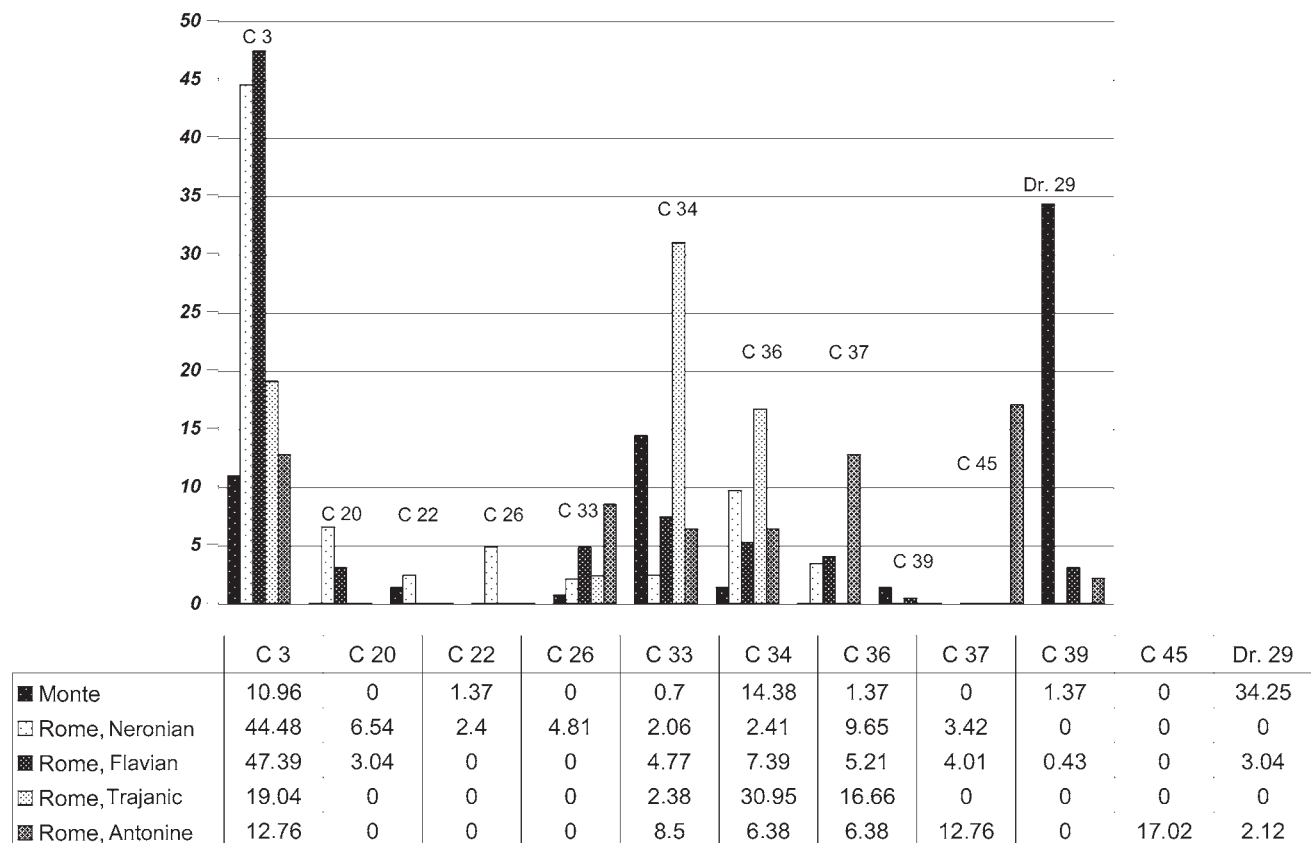


Figure 19.6. Distribution of *terra sigillata* forms II Monte – Rome. After Rizzo 2003, figs. 6, 8, 9.

Table 19.3. Modes of evolution of cuisine in terms of food items and associated cultural practices of preparation (after Fuller 2005, 773 table 3).

Cultural process	Archaeological indication	Etruscan example
Food already used, evolution/elaboration of existing culinary habits	Food items and artefacts for preparation present in earlier period	Use of ollae; Evolution: higher consumption of pork (?)
Food borrowed with practices of preparation	Food items and artefacts for preparation introduced	Introduction of new food items like garum Introduction of Roman dishes (patinae) Introduction of Pompeian Red Ware and African Cooking Ware
New food added to existing culinary practices	New food item appears without other associated changes	Refinement of existing recipes, e.g. seasoning with garum
New food item, with newly created culinary role	New food item associated with new, but not introduced, changes	?

described an analogous picture for Lower Germany:²² a similar apparent increase in the consumption of pork and the arrival of imported pottery forms, both for cooking and serving food, but marked differences between the dietary repertoire and culinary habits at Rome and in the non-urban contexts, both on the Rhine and in rural Northern Etruria. The discrepancies that can be observed between Rome and Il Monte might be due to inequalities in status and supply, but the occurrence of similar divergences at other Etrurian sites hints at a more region-specific explanation. It would stand to reason that traditional forms of food preparation

and consumption were maintained; but that is not entirely true, as there are obvious differences between the older Etruscan and the more modern Roman ways of cooking and eating. On the one hand, native cooking practices and eating habits continued; on the other hand, new elements were adopted. One of these was the new condiment *garum*, imported in amphoras such as Dressel 14.²³

As Gillian Hawkes wrote in a programmatic article, the Romanisation model failed to explain these developments, because something new, a “fusion”, developed (Hawkes 1999, 90–93). The theoretical background for this approach

was adopted from linguistics and the process was termed “creolisation”²⁴. In this sense, cuisine as practised at Il Monte was neither Roman nor Etruscan but a new “creolised” one.

With regard to food, Dorian Q. Fuller developed a general framework for analysing the adoption of different practices of food preparation that takes into account both food items and concomitant aspects of material culture (Fuller 2005, 761–777, esp. 773 table 3). The model helps to concentrate on food, not on ceramics; that is to say, on the *purpose*, not on the *means*, of culinary techniques (Table 19.3). This approach makes it clear that cuisine was a complex cultural technique consisting of different components and that typologising vessel forms is not enough. Preparing food at Il Monte included elements used for a long time in Etruria, such as *ollae*, but also elements that were adopted more recently, like *patinae* or *garum*. Thus a cuisine was developed that was neither purely Etruscan-traditional nor purely Roman-urban. In order to understand this process in detail, as well as the factors – chronological, social or geographical – that drove it, more case studies are needed.

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Notes

- 1 E.g. Appadurai 1988; Bell and Valentine 1997; Counihan 1999; Scholliers 2001; Mintz and du Bois 2002; Lyons 2007; Tuomainen 2009; on the influence of identity on eating habits see Carrius 2011.
- 2 Studies on food in Roman Britain: Meadows 1994; Meadows 1997; Hawkes 1999; Meadows 1999; Hawkes 2001; Hawkes 2002; Cool 2006 (with bibliography).
- 3 Studies on Apicius: Edwards 1984; Alföldi-Rosenbaum 1988; Bode 1999; Edwards 2001, 255–263; Gerlach 2001.
- 4 A similar approach was used for analysing prehistoric pottery in Greece: Day and Wilson 2004.
- 5 For definition: Santoro Bianchi 2005; see also Panella 1996.
- 6 For the method: Orton 1975; for a survey of different quantification methods: Orton 1993; Symonds and Hayes 2007, 68–70 (no sufficient quantification methods in use outside Western Europe).
- 7 The assumption that this was a higher-status building is based on finds of painted wall plaster and mosaic tesserae.
- 8 Definition of vessel form e.g. Dyson 1976, 15; Menchelli *et al.* 2006, 71; name: Hilgers 1969, 39–40.
- 9 As attested by literary sources: Hilgers 1969, 112–113.

- 10 In general: Hayes 1972, 205–211; Tortorella 1981, 208–224; Ikäeimo 2003; Gandolfi 2005, 224–232; ACW in Northern Etruria: Pasquinucci *et al.* 1998.
- 11 Casseroles are subsumed under dishes in Figs. 19.1 and 19.2.
- 12 Internal Red-Slip: Peacock 1977; Peña 1990; *patina*: Hilgers 1969, 72–73.
- 13 As no other excavation report known to the author employed the method of quantification by EVE, the following remarks are therefore based on sherd counts so as to enable comparison.
- 14 Perkins and Attolini 1992, 104; sooting on cookwares: Skibo 1992, 145–173; on Roman cookwares: Peña 1999, 122–137; Peña 2007, 57–58.
- 15 Bone analyses were conducted by Dr Ralph Prillhoff, Wollmirstedt. I thank Dr R. Prillhoff for his fast and accurate work. The comparative figures used in the following have been mainly collected by: King 1999, esp. 192; MacKinnon 2001, esp. 654–655.
- 16 King 1999, 192. The bone numbers from the *terme del nuotatore* differ slightly, but the pig bone share is still higher than that of Monte; e.g. IPU 1973.
- 17 The Roman data are originating from the excavation of the Acqua Marcia and are dated to the 1st century BC and the 1st century AD: De Grossi Mazzorin 1996.
- 18 Based again on King 1999, 192; MacKinnon 2001, 654–655. See in general on meat consumption: Barbieri 1987.
- 19 See also Vroom 2007, 343. I owe this observation and the reference to J. Vroom to an anonymous reviewer of my paper.
- 20 Ettlinger 1990, 56–57.
- 21 Vessel volume as hint at communal eating in another context: Hawthorne 1997.
- 22 Okun 1989, 114–127.
- 23 Bruno 2005, 371, 382–383.
- 24 Archaeological framework: Webster 2001; Webster 2003.

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CULINARY CLASH IN NORTHWESTERN IBERIA AT THE HEIGHT OF THE ROMAN EMPIRE: THE CASTRO DO VIEITO CASE STUDY

António José Marques da Silva

Introduction

A recent (2004–2005) large-scale archaeological intervention has resulted in the excavation of an immense assemblage of ceramics, coming from the indigenous population of Castro do Vieito in northwestern Iberia at the height of the Roman Empire. The study of this assemblage forms the basis for a reflection on the way a community belonging to a non-elite local “sub-culture” maintained direct contact over a period of time with the soldiers of the empire’s army, and how they received Roman foodways. The acquisition of ceramic kitchenware originating from other regions of the empire, particularly the Baetican Haltern 70 amphorae, has been well documented in this settlement. Nothing indicates that there was a significant change in culinary practices amongst its inhabitants, who maintained their allegiance to their native culinary traditions. It can be said with certainty that, sometimes, these imported ceramics were used for purposes other than those for which they were originally intended. In reality, several generations elapsed between the first moment of contact with foreign culinary skills and the eventual general abandonment of local culinary traditions in this region. The definite adoption of the Roman culinary approach was to occur only at the end of the 1st century AD. This time lag is symptomatic of the asynchronous, non-linear nature of this process. The linguistic concept of “creolisation” is called upon at the end of the text; this concept can help to improve our understanding of the cultural dynamics of the process, *i.e.*

those that do not fit into the standard parameters of what is usually understood by “Romanisation”.

Historical context

Castro do Vieito is situated on the banks of the estuary of the River Lima, on Portugal’s northern coast (Fig. 20.1). This settlement had a very short period of occupation, corresponding to the very earliest stages of the integration of northwestern Iberia into the *orbis romanum* (from the



Figure 20.1. Location of the Castro do Vieito archaeological site in the context of Hispania. Drawing J. L. Madeira.

reign of Augustus until the middle or third quarter of the 1st century AD) (Alarcão 1988). After the conquest, the inhabitants of this region experienced what R. Hingley has called “highly discrepant experiences” (Hingley 2005, 105). They were on the periphery of the standard course of integration within the empire, of what we might call in a generic way “Romanisation”. Their social organisation and built landscape, made up of fortified hill-top settlements (*castros*), both appear to have remained largely unaltered at the beginning of this process, as does the native material culture.

The Romans drafted a permanent military contingent to this peripheral region of the empire in order to control the exploration of its abundant mineral resources and to recruit soldiers for the auxiliary corps of the imperial army (Le Roux 1982; Millett 2001, 167). The final conquest of northwestern Iberia mobilised a vast military contingent made up of seven or eight legions and various auxiliary units (Morillo Cerdán 2005, 21). The military forces involved in the conflict were gradually removed after the conquest. The *I Augusta?*, *II Augusta* and *V Alaudae* legions left the region during the reign of Augustus, followed by the *III Macedonica* during the reign of Tiberius. Only two legions (*VI Victrix* and *X Gemina*) and some auxiliary corps remained under Caligula, joined by the *legio I Aduitrix* at the time of the civil war (AD 68–69) (García-Bellido 2006, 630). In the Flavian period, the *exercitus hispanicus* was made up of only the *legio VII Gemina* and four auxiliary regiments (Santos Yanguas 1988). Thus the permanent military complement in the region went from 50,000 men at the end of the conquest to 27,000 men at the time of Tiberius, 18,000 men by AD 63 and only 9,000 men between AD 63 and AD 68 (Tranoy 1981, 170).

In the initial phase of the military occupation both goods and people were transported mostly by river or sea (Naveiro López 1991, 139). Castro do Vieito’s setting in a strategic location on the river estuary, close to one of the region’s largest mineral seams, made this settlement an important node in the military supply network. Regular supplies were needed for the drafted military personnel who controlled locals prospecting for gold upstream on the River Lima (Silva 2012, 114). Thus, this community was granted a privileged knowledge of the Romans’ culinary traditions via this network, which was mostly used to bring food for the Roman soldiers. Even if a significant quantity of food was acquired locally, “comfort food” was imported from other areas, places that might be very distant, but that had been part of the empire from early on (Stallibrass and Thomas 2008, 155). These familiar foodstuffs ensured that the soldiers kept their *humanitas* within an environment of “barbarians”, because the food regime was one of the factors that distinguished civilised men from barbarians (Montanari 1997, 108).

It is even probable that military personnel or veterans of the auxiliary corps of the Roman army took up residence within this community at some times (Silva 2012, 157). The members of this community could be considered a local non-elite “sub-culture”, with levels and forms of interaction with the occupier’s culture that were distinct from those of the rest of the indigenous society, elite and non-elite alike. The level of stratification of the indigenous society in the period prior to the conquest is a very controversial issue. Many authors even question the existence of local elites before the arrival of the Romans (González Ruibal 2007, 401–450). The archaeological profile of this period reveals great uniformity in culinary and food customs, so one can say at least that it is highly unlikely that differences in the consumption and preparation of food were factors in the construction of social distinction at this time.

The ceramic assemblage

Roman kitchen ware was initially only introduced in the military camps and in the region’s administrative capitals, and was not used by the majority of the native population. Within the indigenous context of this era, the archaeological profile only documents the existence of amphorae of the Baetican Haltern 70 type and, more rarely, fine ceramics, Campanian ware or *terra sigillata* from Italy, with an almost total absence of ordinary Roman kitchen ware (Martins 1990, 169).

Traditional indigenous earthenware was hand-made at this time and fired at low temperatures in a reducing atmosphere. For this reason, black or grey clay with a metallic sheen, resulting from the addition of mica to the clay, was predominant. Kitchen equipment consisted of a static repertoire of easy-to-reproduce objects. The food preparation techniques in which these vessels were used were rudimentary, though adequate for simple family life in the traditional circular dwellings, centred around the fireplace. Pots with a flat base and an ‘S’-shaped profile were placed directly on the hearth and surrounded by burning coals, whilst other vessels, such as pans with two side handles and pans with inner upright handles, were hung on a rack rail over the fire, allowing food to be prepared and cooked slowly (Queiroga 2003, 64; Fig. 20.2).

From the end of the 1st century AD, this repertoire of traditional, local earthenware was replaced by another, clearly inspired by the Roman repertoire and techniques: earthenware made on the wheel, fired in an oxidising environment using light-coloured clay, frequently highlighted with an application of a slip of the same tone. Now, the *batterie de cuisine* included typical forms of ordinary Roman ceramics, such as plates, cooking dishes and mortars whose inner surface was furrowed. This

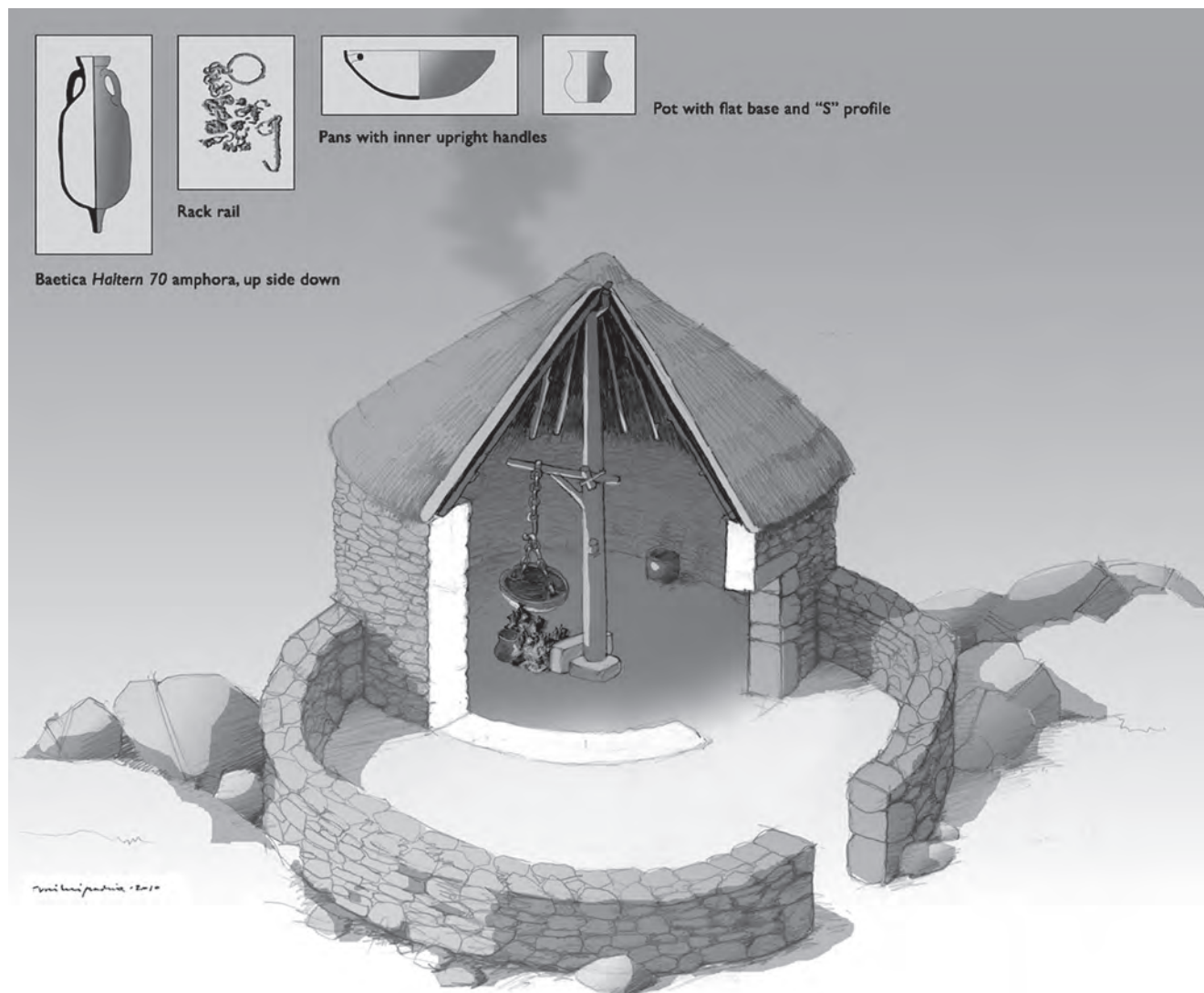


Figure 20.2. Reconstruction of a traditional house of the Castro Culture, based on the results of the excavation of the house correlated with the archaeological structure P0186 of the Castro do Vieito archaeological site. Drawing J. L. Madeira.

suggests that at this time the local population adopted more sophisticated cooking techniques that profoundly altered their way of preparing food (Silva 2012, 76).

These two realities are well known, having been the object of various PhD theses published over the last 30 years (Silva 1986; Martins 1990; Almeida 2003; Queiroga 2003; Morais 2005). However, the way in which one reality shifted into the other was barely understood until the present time. The ceramic assemblage presented here dates from the initial phase of the military occupation of the region, at the precise moment of “culture clash” when the traditional local way of life met that of the Romans, introduced by the soldiers of the imperial army. Thus, we can understand more precisely how this meeting between

the two cultures took place by looking at culinary practices within the context of this particular non-elite local “sub-culture”.

The archaeological intervention

About two-thirds of the total area of the archaeological site of Castro do Vieito was affected by the construction of the A28 motorway in 2005 (Fig. 20.3). This critical perimeter of around 15,000 m² was the object of a large-scale archaeological intervention carried out between June 2004 and July 2005 and directed by the author of this article with a team of 150 people. The strategy adopted was to excavate



Figure 20.3. Schematic plan of the Castro do Vieito. Drawing A. J. M. Silva.

and record all the archaeological deposits (corresponding to a volume of around 12,000 m³), and to dismantle all the identified structures as far as the rocky substrata, a common practice in archaeological interventions within the context of rescue archaeology.

A non-selective and systematic strategy of collecting the archaeological finds was intentionally adopted. The sample of ceramics studied corresponds to a total mass of around 14 tonnes.

Results

There being no evidence of ceramic production in the extensive area under study, it can be assumed that the earthenware used by the inhabitants of this settlement was obtained from the professional potters in the region (Silva 1986, 126), who would frequently identify their wares with their own personal mark (Fig. 20.4). The marks are generally simple, geometric motifs, being cut, finger-



Figure 20.4. Indigenous potter's marks from Castro do Vieito. Drawing A. J. M. Silva.

imprinted or sometimes stamped (Fig. 20.4, CV-DS-16) on the objects before being fired. Some of these markings were already known in other indigenous settlements in the region, such as Sanfins and Briteiros (Silva 1986, 126, fig. LXIII nos. 1–3, 15–17, 39–41, 48–49). Only one object (Fig. 20.4, CV-F-238), a cooking dish of Pompeian red ware (Hayes 1997, 78) from a stratigraphic unit dating from the middle

of the 1st century AD, showed the mark *OQVIN* stamped on the bottom. This stamp identifies the *QUINTUS* workshop that produced this type of ware in the city of *Lucus Augusti* (Naveiro López 1991, 181).

The dependence of Castro do Vieito's inhabitants on external sources for such everyday goods is paradoxical, when seen within the context of the generalised self-

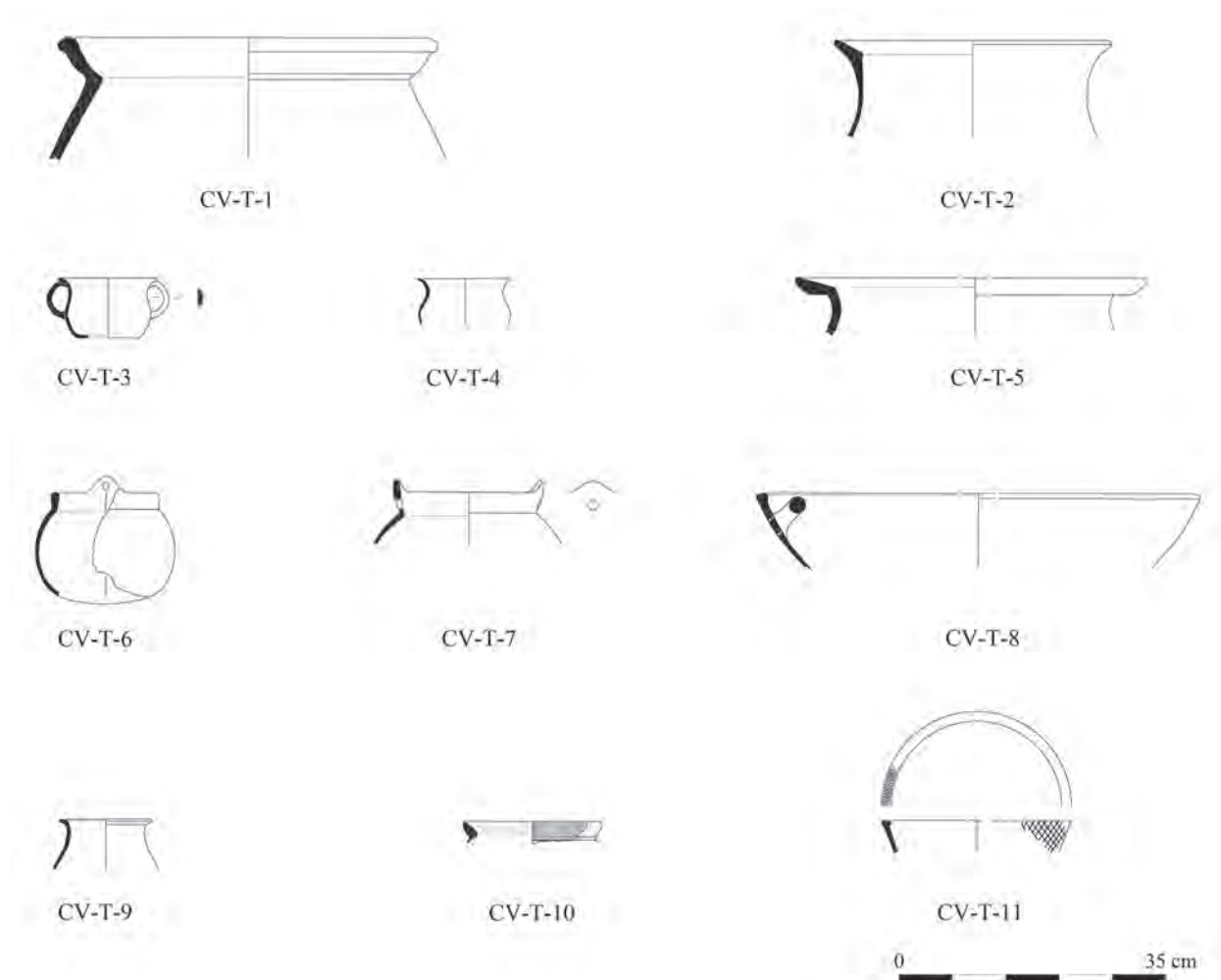


Figure 20.5. Traditional indigenous types of pottery from Castro do Vieito. Drawing L. G. Pereira/A. J. M. Silva.

sufficiency that is so unmistakable at other levels of the archaeological record of this settlement (Silva 2012, 74).

The predominance of a formal repertoire of local ceramics ($82.86\% \pm 0.54$) is a clear indication of the continuity of traditional culinary practices, which goes along with the perpetuation of the local model of the organisation of domestic space (Fig. 20.5). However, imported ceramics are not entirely absent from this set. Amphorae are the most common exogenous products and amount to the considerable number of 3,320 MNI (or Minimum Number of Individuals, see Symonds and Haynes 2007, 69). By comparison, the archaeological assemblage of the capital of the *conventus*, Bracara Augusta, where archaeological interventions on a large scale have been carried out for more than 20 years, comprises only 1,457 MNI to date (Morais 2005, 100); that is to say, less than half the total of amphorae collected at Castro do Vieito.

The majority of the ceramic finds at Castro do Vieito are Baetican amphorae of the Haltern 70 type ($8.59\% \pm 0.4$, Fig.

20.6). It is, in fact, the largest assemblage of amphorae of this type found to date in the whole of the Roman Empire (Silva 2012, 108). This particular type, which many scholars consider to be related to military supply in northwestern Iberia (Morais and Carreras Monfort 2004, 97), would have been easily accessible to this community. It had an important function in the system of military supply, which largely depended on river access in order to reduce the cost of transporting goods between the coast and the inland area where the greater part of the permanent soldiers were billeted.

This would explain the elevated number of vessels of this type when compared with the pottery assemblages of the neighbouring indigenous settlements. In a large settlement such as Citânia Velha de Santa Luzia, 5 km to the west, the object of various large-scale archaeological interventions, Haltern 70 type amphorae total no more than 22 MNI. Amphorae of this type from the settlement at Terronha, 5 km to the east, where the area of intervention was 8,000

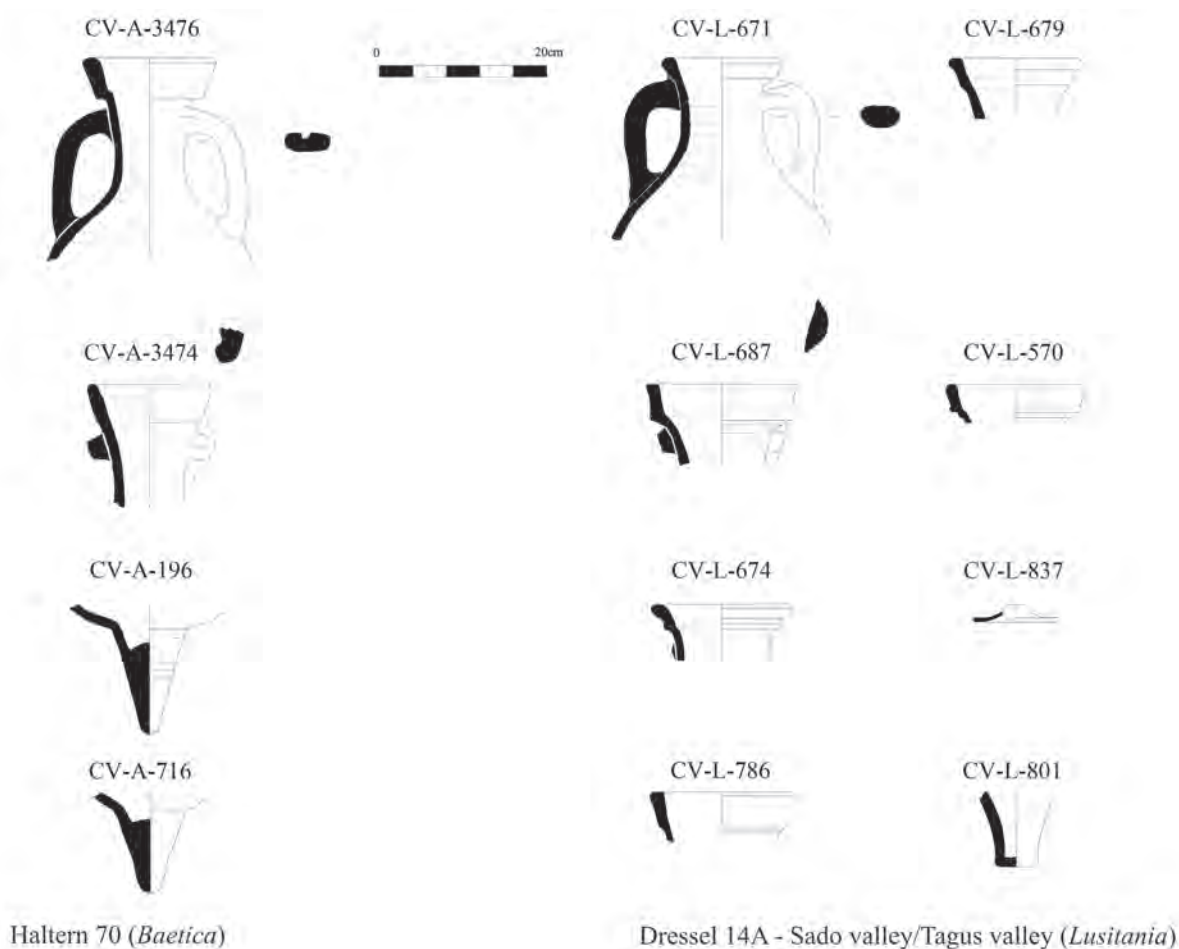


Figure 20.6. Roman amphora types from Castro do Vieito. Drawing L. G. Pereira/A. J. M. Silva.

m², amount to no more than 8 MNI (Morais and Carreras Monfort 2004). Whatever product was transported in these amphorae, its consumption by the local communities must have been of little significance. If we accept the idea that Haltern 70 amphorae were mainly used to transport wine (Étienne and Mayet 2000, 82), little space remains to assert, as certain authors do (Naveiro López 1991, 109; Morais 2004) that their presence in the region shows that the local population began at that time to consume wine imported from Baetica. This idea is also contradicted by Strabo's testimony (3.3.7) that the inhabitants of the region were sober and drank only water. According to him, the consumption of wine (which was produced locally in small quantities) was rare and kept for special occasions.

However, there are several indications that suggest re-use of these receptacles for various purposes other than those for which they were originally made. In the majority of cases, the context in which they were deposited does not allow one to gauge how these amphorae were re-used. They would probably have been used for food, but of a different

type from that which was transported in them originally (Almeida 1986, 126). This type of re-use is normally difficult to demonstrate. However, there are some signs that may indirectly confirm this practice (Silva 2012, 72). The fragment of a handle CV-A-5098, coming from the post-abandonment level (C0004 XIV 16), was decorated with a set of five dots cut into the clay, forming a half-circle, around a sixth dot on the surface of the handle's base. The series of dots are, in fact, one of the most common motifs used to decorate the ceramics of the settlement's indigenous tradition. Another fragment, from the Tiberio-Claudian occupation level (D0230 XXIX 21), showed in turn a series of painted black dots on the inner rim of the lip. Painted black geometric decorations have also been observed on other artefacts of the indigenous tradition. Some authors believe that the decorated artefacts were used on special occasions, namely for banquets in some areas of northwestern Iberia (González Ruibal 2007, 498), a hypothesis that cannot be dismissed out of hand but which is difficult to prove in our present state of knowledge. However, the fact that these

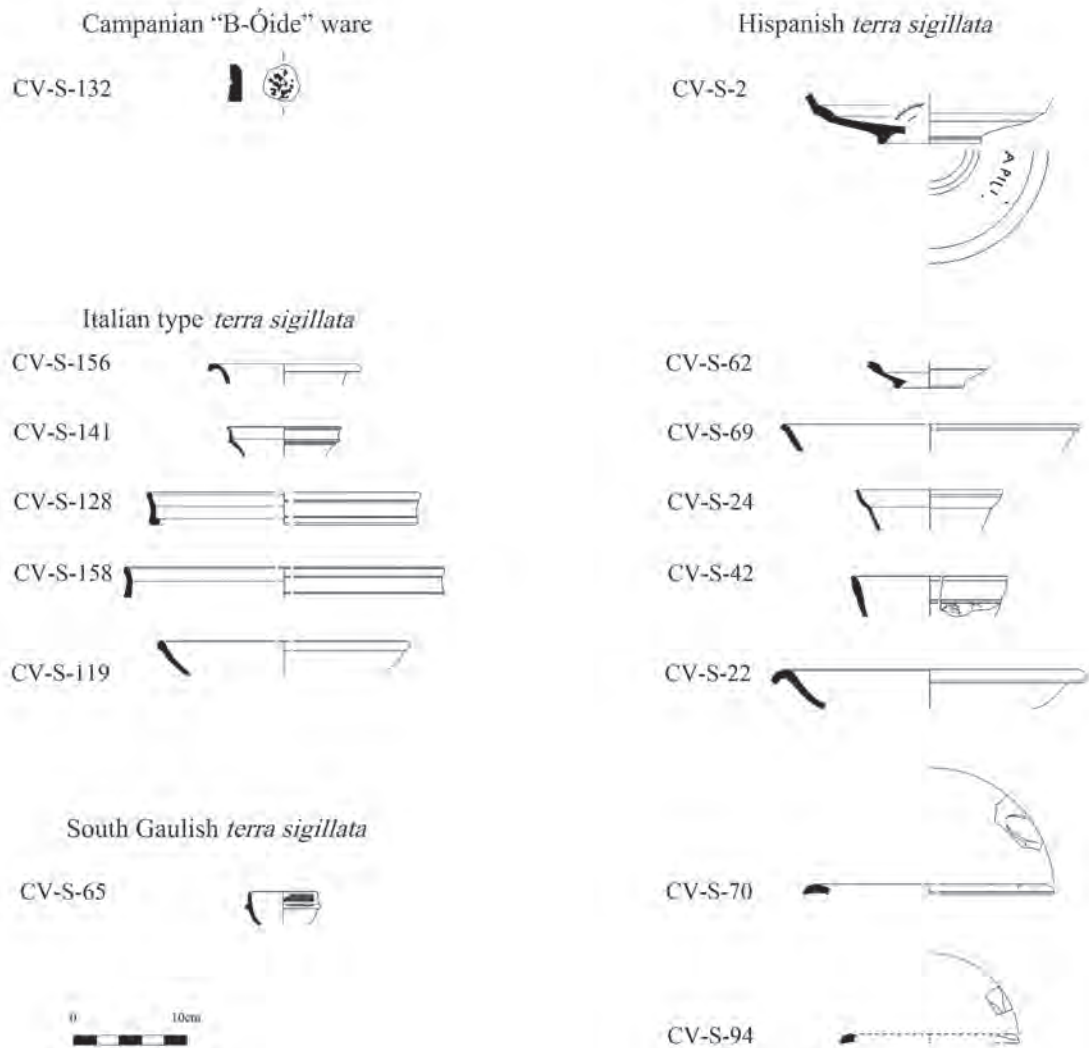


Figure 20.7. Roman fine wares types from Castro do Vieito. Drawing Liliana G. Pereira/António J. M. Silva.

receptacles were decorated as though they were part of the indigenous repertoire may indicate that they were used locally in the same way as the local artefacts.

The excavation of a hut (M0259/M0682/M0692) allowed the observation that a Haltern 70 amphora had been partially buried on the coarse sand level (P0186) in the hut's interior, dating from the Julio-Claudian period. It is not strictly possible to say what would have been the new function of this object. However, as the top and the base had been removed before it was placed in this position, it would certainly not have continued to be used as a receptacle (Fig. 20.2).

Other types of amphorae, such as the Lusitanian Dressel 14A amphora ($1.03\% \pm 0.14$) and some imported fine ceramics, such as *terra sigillata* from Italy ($0.1\% \pm 0.05$), Southern Gallia ($0.05\% \pm 0.03$) and Hispania ($0.16\% \pm 0.06$), are

equally represented, although often residual (Fig. 20.7). A substantial part of these artefacts had a second cycle of use after having been broken, frequently being transformed into spindle whorls (131 examples) or into circular plugs (Fig. 20.7, CV-S-132).

Despite the fact that foreign ceramics were in the minority, the techniques used by the Romans seem to have influenced the potters of the region. They reproduced certain aspects of Roman production in a limited number of objects from this assemblage ($5.5\% \pm 0.33$): the light colour of the clay due to firing in an oxidising environment, sometimes highlighted by the application of a slip on the surface; the introduction of certain morphological characteristics of Roman ceramics, such as the ring base; and even the reproduction of some forms of ordinary Roman earthenware, such as cooking dishes and jugs (Fig. 20.8). As

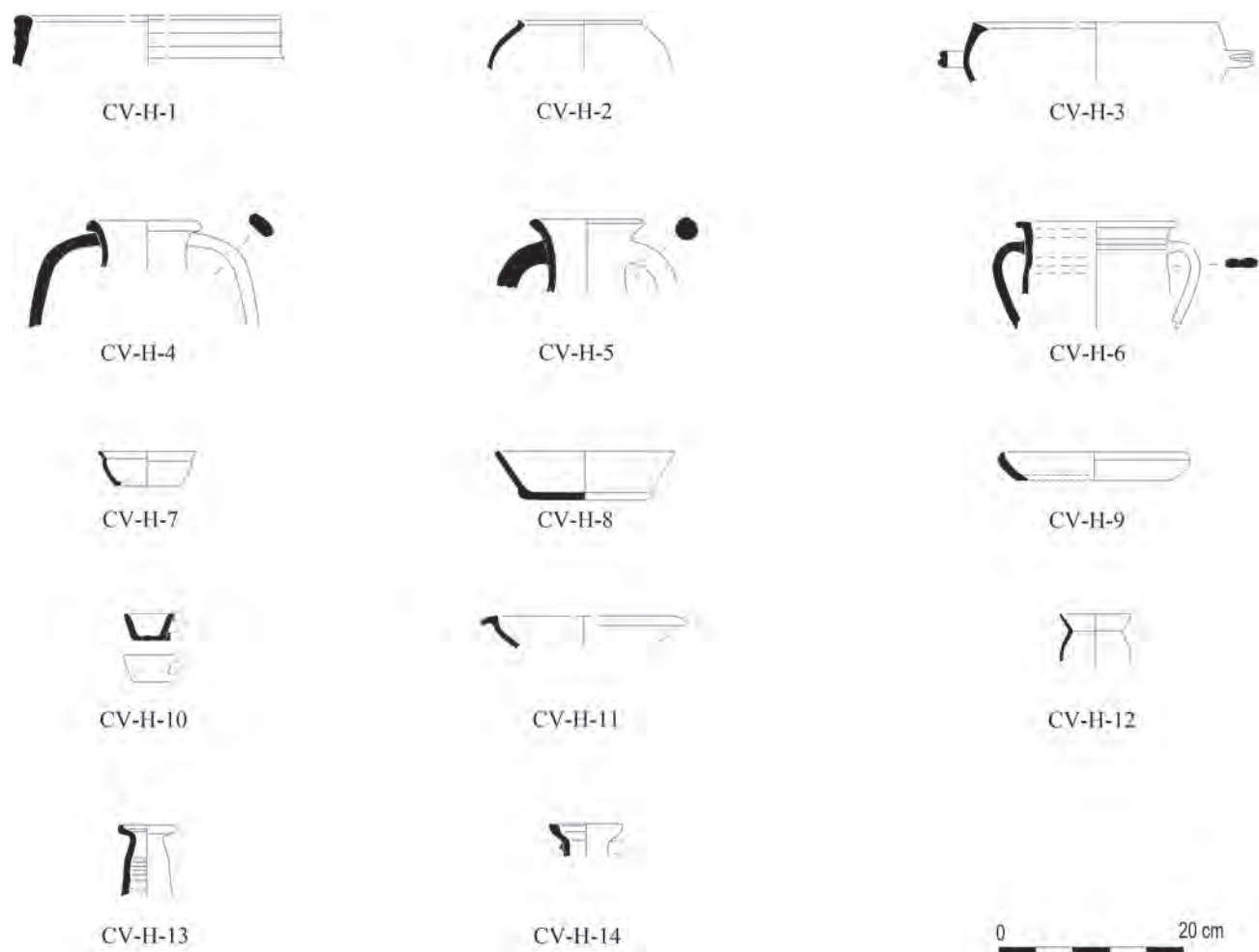


Figure 20.8. Hybrid types of pottery from Castro do Vieito. Drawing Liliana G. Pereira/António J. M. Silva.

a rule, the artefacts that form this set simultaneously show morphological and/or technological characteristics of an indigenous tradition and others of an exogenous one (Silva 2012, 77): they include indigenous vessel forms such as pans with two handles fired in an oxidising environment, the Drag. 37 *terra sigillata* shape in a traditional black micaceous clay, etc. In this way, they can be said to form a ceramic set of hybrid production, in the literal sense of the term. However, the small number of such pots shows that these “hybrid” products were not preferred by the inhabitants of the settlement, even by a particular segment of the community, as “hybrid” vessels, traditional vessels and imported vessels are randomly dispersed across all excavation areas (Silva 2012, 77, figs. 3.19, 3.25, 3.28, 3.29, 3.31, 3.32).

Conclusions

There is a certain tendency in scholarship to define

native culture by opposition to Roman culture, both being conceived as two necessarily antagonistic, monolithic and unchangeable realities (Webster 2001, 216). The native culture had been often defined in the past as a function of a dialectical relationship between the local elite, desiring to embrace the cultural model of the Roman elite, and the rest of the population, whose attitude to the invaders’ culture had been considered in significantly different ways depending on the author: rejection pure and simple (Haverfield 1915, 79); immediate partial adoption (Collingwood and Myres 1936, 222); or even indirect adoption via its emulation by the local elite (Millet 1992).

Generally speaking, cultural elements introduced by an occupying army are rarely assimilated by the indigenous population, and if so, only in a superficial way. In fact, only limited segments of the indigenous society maintained a direct, repeated contact with an equally limited segment of the invading society (*i.e.* their army), and were thus susceptible to influences that altered their way of

conceiving the world and of living in it (Bastide 1971, 49; Woolf 1998, 15). Those segments in contact with each other do not necessarily correspond, or at least not exclusively so, to the elites of the two societies in question. The Roman soldiers, for example, make up what Simon James designates as a non-elite “sub-culture” (James 2001, 200), in which the indigenous population participated, being recruited for the auxiliary corps from this period onward. When these soldiers returned to their homeland and to civilian life, they must have spread some of the values and knowledge assimilated during their military career to their native society. At the end of their military service, these soldiers became Roman citizens, entirely independent of whether they become part of the local elite or not.

Thus, it is not possible to think of the local culture as a homogeneous whole, having only a single attitude towards the invading culture. Auxiliary corps veterans returning to civilian life, potters involved in the provincial economy, the local elite, members of the estuary community involved in the army’s supply network ... all, in their own ways and with their own particular ways of life, participated in the construction of the provincial culture. For this reason, this case study alone cannot explain the changes in the ways of preparing and consuming food in northwestern Iberia during the Roman period as a whole, but can merely chart the way these changes occurred in a very particular non-elite local “sub-culture”.

On the other hand, when an indigenous population adopted definite elements from the invaders’ culture, this does not signify that they necessarily accorded them the same value, the same significance and the same function that these elements had held in the culture of origin. In reality, many exogenous artefacts had a “second life” in the hands of the indigenous population, being used for other ends than the ones for which they had been created. These artefacts, as we have previously seen, were frequently even reworked for this purpose. The great homogeneity of the elements of material culture relating to these practices, with regard to the set of dwellings within the settlement, equally suggests that the consumption of food continued not to be considered as a clear sign of social distinction in this “sub-culture”.

In practice, the local people tended to relate to these new elements in such a way as to integrate them into their daily practices, but in their own particular way of viewing the world. This process consisted of re-understanding the elements coming from outside and integrating them into systems that had significance for the indigenous population. What we can observe is thus not a replacement of an indigenous cuisine by one coming from outside, as implied in the anthropological concept of acculturation (Barnard and Spencer 1996, 594) that has often been used

to explain cultural change in archaeology (Woolf 1998, 14), but rather a process of “creolisation” (Webster 2001). The linguistic concept of “creolisation” seems to be the more appropriate framework, provided that cultural change is not regarded exclusively as a form of negotiation within the context of asymmetric relationships of power (Mattingly 2011, 203). In this way, cultural dynamics may be considered without assuming from the outset that there is a constant, linear relationship between the different dimensions of this process – in this specific case ceramic consumption, customs associated with food and their social significance.

Thus, in this case study, the inhabitants of the community under analysis, despite having probably observed the culinary practices of the Roman occupiers first hand, opted to maintain both traditional cooking techniques and traditional cooking utensils, even after having got to know and, from time to time, acquired earthenware associated with the foreign culinary practices. The availability of new culinary technologies and new food products has a general tendency to broaden the “*espace de liberté alimentaire*” for the “eaters” (Poulain 2006, 19). This may or may not, as appears to be true in this case, bring about immediate change with regard to food habits. In the majority of cases, this earthenware was used for purposes different from those with which the vessels were associated in their original cultural context. Thus, acquiring Roman ceramics does not necessarily affirm allegiance to a specific social group or engender the reproduction of culinary habits associated with these objects within their cultural context of origin (Hingley 2005, 111). New artefacts may even be integrated within a cultural set, a long time before the integration of new ideas or new habits associated with them from their original context (Woolf 1998, 14).

The profound change in the indigenous population’s way of life that is observed from the end of the 1st century AD onwards can thus only be understood as a gradual process of cultural selection involving several generations, which progressively led to the disappearance of some of the more significant elements of the indigenous culture seen before the Roman military occupation. “Becoming Roman”, after all, can sometimes be a slow process (Woolf 1998, 7).

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COARSE KITCHEN AND HOUSEHOLD POTTERY AS AN INDICATOR FOR EGYPTIAN PRESENCE IN THE SOUTHERN LEVANT: A DIACHRONIC PERSPECTIVE

Alexander Fantalkin

Egyptian involvement in the affairs of the southern Levant is well attested during a number of historical periods. Depending on the geo-political situation, sometimes it took the form of direct imperial rule that lasted for quite a long period; sometimes we are dealing with a brief historical episode. In what follows, I shall concentrate on coarse kitchen and household pottery brought to Palestine or produced locally by Egyptian representatives (not always necessarily of Egyptian origin), using a diachronic perspective. For this purpose, I shall utilise a number of case studies from different periods, namely from the Late Bronze Age,¹ the Iron Age and the Early Islamic period (Fig. 21.1). Coarse household ware, and in particular kitchen pottery, appears to be a sensitive indicator of the nature and duration of the ruling regime in the colonised land.

The Late Bronze Age

The Late Bronze Age and the very beginning of the Iron Age in Canaan are characterised by a strong Egyptian involvement and influence starting with the expulsion of the Hyksos at the beginning of the 18th Dynasty. Whereas in the course of the 18th Dynasty Egypt's involvement in Palestine seems to rely on a suzerain-vassal relationship with a minimum permanent physical presence, as is well attested in the Amarna letters, the archaeological evidence from numerous Canaanite sites contemporaneous with the late 19th and 20th Dynasties reflects a change in the

mode of Egyptian interference and control (Morris 2005). Local unrest, the Hittite activity in Syria and eventually the Sea People's movements caused Egypt to adopt a more aggressive approach,² based on the installation of military and administrative personnel in Canaan, especially in the southern part of the country, but also along the main strategic and trade routes (Hoffmeier 2011; 2013). It is mainly in this second stage that one finds abundant material evidence for Egyptian presence: architectural elements, such as Egyptian or Egyptian-style buildings and statues; stelae; hieroglyphic and hieratic inscriptions; certain burial practices; a variety of small finds (votive objects, scarabs, plaques, glass, faience, ivory, etc.); and, finally, imported Egyptian and Egyptianising pottery. It should be stated explicitly that actual Egyptian ceramic imports are quite rare in Late Bronze Age Canaan (especially during the days of the late 19th and 20th Dynasties) and the bulk of the Egyptian material consists of locally produced Egyptianising pottery (Martin 2011). According to Martin's comprehensive analyses of these wares, apart from the shape, it is mainly fabric properties and technological choices (such as the admixture of abundant straw temper, the surface treatment or the use of specific clay-sources resembling Nile clay) that suggest that this pottery was probably produced by Egyptian potters, or at least under close Egyptian guidance (*ibid.*, 259, with further references). These wares consist of a variety of household types, both open and closed, used mostly for food consumption.

Until quite recently, it was commonly assumed that

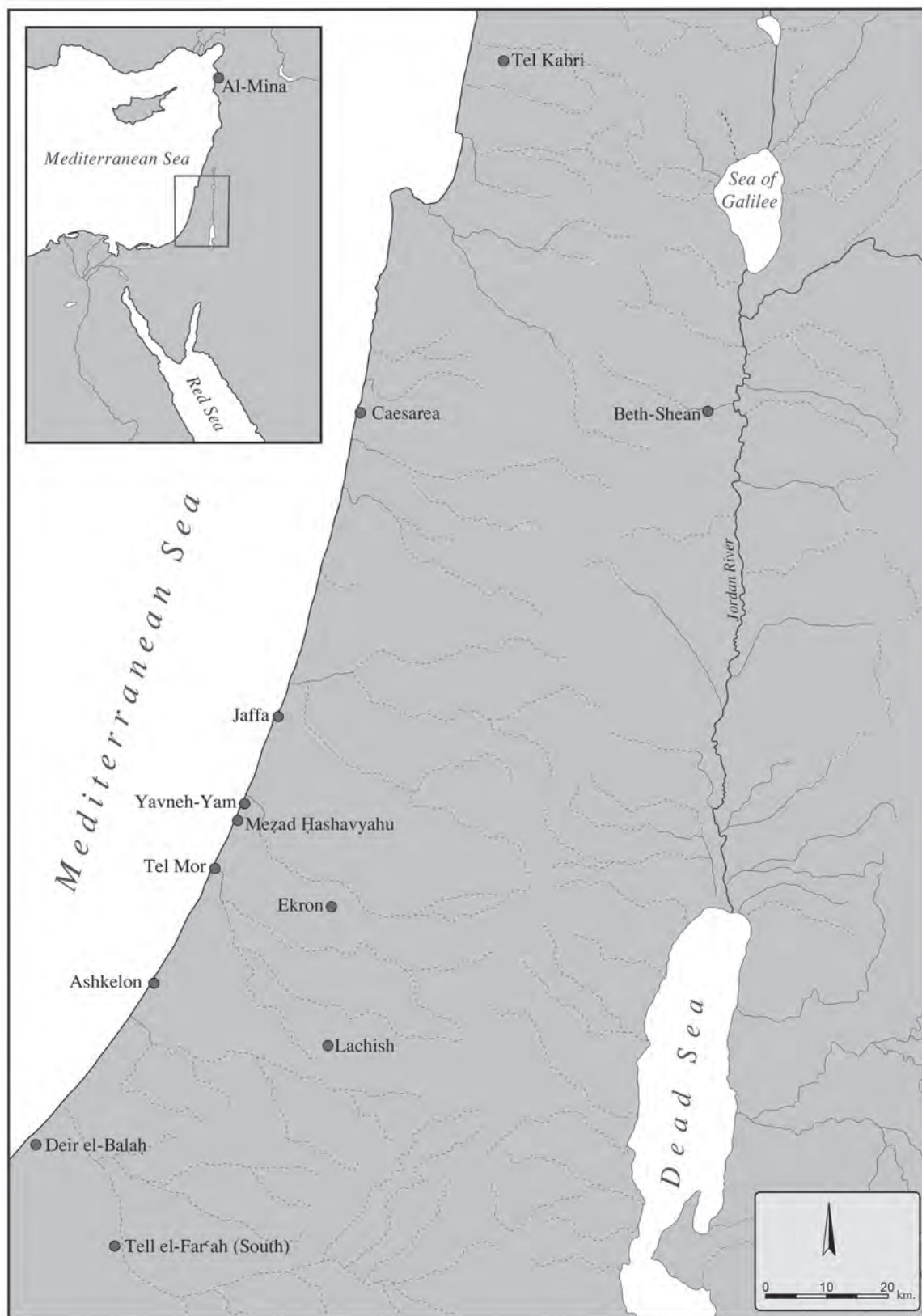


Figure 21.1. Map of the Levantine sites mentioned in the text. Map created by Itamar Ben-Ezra.

there was a strong Egyptian presence in 13th- and 12th-century BC Canaan in the form of garrisons, the so-called “direct rule” model (*e.g.* Weinstein 1981). This model has been challenged by Higginbotham (2000), with a model of “elite-emulation”, according to which the Egyptian policy during the Late Bronze Age period remained largely unchanged, and the so-called Egyptianisation attested in Ramesside Canaan represents a voluntary adoption of elite Egyptian culture by the Palestinian ruling class, in an attempt to imitate Egyptian prestige and authority. Whilst this theory might explain the presence of high-prestige goods in local assemblages, the locally produced Egyptian-style household pottery, found almost exclusively in garrison sites or Egyptian administrative centres such as Deir el-Balah, Ashkelon or Tel Mor along the southern coastal plain, or in Beth-Shean in the north, may be considered a strong ethnic marker for actual Egyptian presence (Martin 2011, 266–269).

With the end of Egyptian hegemony during the second half of the 12th century BC (Finkelstein 1995; Kahn 2011), these locally produced Egyptianising ceramic forms basically disappeared. I concur, therefore, with Martin, who, based on detailed analyses of Egyptian-style household pottery in Late Bronze Age Palestine, has rejected a number of major premises in Higginbotham’s theory.

What is extremely interesting is that, when comparing the type-range of Egyptianised assemblages in Canaan with assemblages of the New Kingdom in Egypt, it is mainly Egyptian-style cooking pots that are missing from Palestinian assemblages. That is to say, the cooking wares used at Egyptian garrison and administrative sites in Late Bronze Age Palestine are mostly of Canaanite origin (Martin 2011, 251, 261–262). This evidence is enlightening when compared to the situation in the early Philistine sites, where so-called Aegean-style cooking jugs appear together with Canaanite cooking pots (Killebrew 2005, 220–223; Yasur-Landau 2010, 228–240).³ It has been suggested that the presence of Aegean-style cooking jugs in the Philistine sites points to women as an integral part of the Philistine migration, or rather the waves of Philistine migration, during the 12th century BC (*e.g.* Yasur-Landau 2011).⁴ Although some scholars would not necessarily subscribe to the idea of migration, implying that the Philistine culture is rather a local development, related to the deep structural changes in the eastern Mediterranean during the transition between the Late Bronze and Iron Age periods (*e.g.* Sherratt 1992; 1998; 2013; Drews 1998; Bauer 1998), it seems that certain types of archaeological evidence are on the side of the supporters of migration.⁵

The absence of Egyptian-style cooking pots in the Egyptian strongholds of Late Bronze Age Palestine and the presence of Canaanite cooking pots suggests, according to Martin, that male Egyptian soldiers and representatives

of administration married Canaanite women during long-term service in the foreign land (Martin 2011, 262).⁶ Mazar, in his discussion concerning the Egyptian garrison site at Beth-Shean, has accepted this as a plausible explanation; however, according to him, other explanations are equally conceivable: thus “Canaanite women could be part of Canaanite families who lived at Beth-Shean aside the Egyptians and cooperated with them” or “they could be local women from nearby settlements serving the Egyptian garrison without actually living at the site” (Mazar 2011, 179).

Comparing the Egyptian involvement in Nubia and Canaan, however, Martin elaborates on the earlier studies, arguing for a strict segregation of the Egyptian complement at the southern frontier from the Nubians, in contrast to very blurred social boundaries between the Egyptians and Canaanites in the southern Levant (Martin 2011, 261). Despite obvious differences in the modes of Egyptian imperial control in Canaan and Nubia, stemming from the structural social differences between these two geographical extremities, the picture of strict Egyptian segregation at the southern frontier of the empire is probably incorrect (van Pelt 2013). Based on the presence of Nubian cooking pots at Askut, Smith (2003) has demonstrated convincingly that Egyptians and Nubians not only actively collaborated in the matter of trade but also may have intermarried – with Nubian women having had a profound impact on colonial society – in spite of a politically charged ideology of segregation and cultural distinctness.

Taking into consideration the longevity of the Egyptian rule in Canaan during the Late Bronze Age,⁷ accompanied by the establishment of a network of garrison cities that were in operation for a very long period of time, the idea that the absence of Egyptian-style cooking pots and the presence of Canaanite ones reflect Egyptian-Canaanite intermarriages is quite appealing.

The Iron Age

After the Egyptian retreat from Canaan at some point during the second half of the 12th century BC, it took some 500 years for the Egyptians to return forcefully with the aim of establishing a new empire. One can mention earlier attempts during the days of Shoshenq I in the late 10th century BC (Fantalkin and Finkelstein 2006) or, perhaps, during the days of the 25th Dynasty (Kahn 2004); however, Egyptian rule over the entire southern Levant became possible once again only following the Neo-Assyrian withdrawal from the area, probably in the thirties of the 7th century BC (Fantalkin 2001; Schipper 2011).⁸ Unlike the previous Egyptian domination during the second millennium BC, which lasted for several centuries, this

time direct Egyptian rule lasted only some 30 years, until the beginning of Neo-Babylonian expansion toward the end of the 7th century BC (605 BC: destruction of Carchemish; November/December 604 BC: destruction of Ashkelon).

The sudden appearance of East Greek pottery (including coarse wares, such as cooking pots) in the coastal plain of Israel during the last quarter of the 7th century BC, with the main spots at Ashkelon and the fortresses of Mezad Hashavyahu and Tel Kabri, is best explained as representing Greek mercenaries in the employ of the Egyptians (Fantalkin 2001; 2006; 2011). The attested distribution and nature of East Greek finds in Palestine and their belonging to a very limited chronological time-span are inconsistent with the existence of a developed Greek pottery trade during the period of Egyptian domination in the late 7th century BC and better explained as representing people – *i.e.* Greek mercenaries. Likewise, there are no indications that coarse Aegean wares, particularly the cooking pots, enjoyed a special popularity in the southern Levant (Niemeier 2001, 16). Even if Master's (2001, 168) observation that in terms of thermal properties the Greek cooking pots of the late 7th century BC were "far superior to cooking pots made from the sands of the Levantine coast" is correct, it appears that this fact remained largely unnoticed or simply ignored by local consumers, as I have already argued elsewhere (Fantalkin 2011, 96). The basis for the conclusion drawn by the Ashkelon team that East Greek cooking pots found at Ashkelon, Mezad Hashavyahu and Tel Kabri were considered desirable luxury commodities by local consumers (*e.g.* Master 2001, 165–169; Waldbaum 2002; 2011, 135–138; Stager 2008, 1585) is therefore not clear. The alternative interpretation, which considers these wares as additional evidence for the presence of East Greek mercenaries in the service of Egyptians, seems more warranted. Likewise, I find problematic Waldbaum's (2002) suggestion that it is difficult to imagine mercenary soldiers, already burdened with their armour, carrying breakable pottery for some sentimental reasons. There can be no doubt that the mobile units of these mercenaries, employed by the Egyptians along the Arad-Beersheba Valley route and supplied by the Judahites, made little use of Greek pottery, since this breakable commodity was of no value to moving troops. However, once stationed at garrisons, these soldiers used the familiar wares alongside the local ones, including imported coarse wares. The Egyptian items from the destruction layer of Ashkelon, such as seals, amulets, bronzes, faience and alabaster vessels (Keel 2011; Herrmann 2011; Bell 2011; Press 2011) as well as ostraca (Cross 2008), alongside the Greek pottery finds, strongly suggest the presence of a Greek garrison operated perhaps by Egyptian officers – the main reason behind the Babylonian destruction of Ashkelon in 604 BC (Fantalkin 2011).

With regard to the cooking wares, one could hypothesise that the East Greek and Carian mercenaries, stationed on a permanent basis and representing Egyptian interest in Palestine, were probably using their own traditional cooking wares, brought with them or supplied by authorised traders, side by side with local ones. We should consider the possibility that whatever East Greek trade existed with Palestine during the late 7th century BC, it would have been directed mainly toward the East Greek mercenaries who were stationed in the region (Fantalkin 2011, 97–98). In this case, those East Greek mercenaries were able to receive some familiar goods, otherwise inaccessible in the local environment. The Greek traders, who perhaps brought these goods to places such as Ashkelon and Mezad Hashavyahu with permission from the Egyptian authorities to supply the Greek mercenaries stationed there, certainly would not have shunned the possibility of conducting business with their local counterparts. However, the main point is that such a trade should be considered a by-product and would be impossible without the presence of the initial intended receiver, that is to say, the Greek garrisons stationed in Ashkelon or Mezad Hashavyahu on behalf of the Egyptian regime. It is worth noting that in Mezad Hashavyahu, not only a variety of East Greek cooking pots alongside the local ones was discovered (Fantalkin 2001, 116), but also a lid of a cooking pot of an Egyptian origin (*ibid.*, 98).

Stationed in a foreign country, probably for a limited period of service, these Greek mercenaries tried to keep their cultural identity by using familiar kitchen pottery. The unusually big dimensions of some of the East Greek cooking pots discovered at Mezad Hashavyahu (Fantalkin 2001, fig. 31.3–4), suggests the occurrence of communal meals among the Greek members of the garrisons, which consisted, most probably, of Ionians, Dorians and Aeolians, coming from the East Greek milieu. This kind of material expression of social relationships as early as the last quarter of the 7th century BC might be considered as one of the important contributions to the emergence of Hellenic self-consciousness and identity later on.

From a chronological point of view, detecting these cultural preferences, however, was possible only due to a very brief period of Egyptian domination in late 7th-century BC Palestine. When Egyptian imperial domination was well established and lasted much longer, as in the case of the Late Bronze Age, it is the adoption of locally produced cooking pots, instead of even producing imitations, that one observes within the archaeological record. One could imagine that – contrary to the situation during the Late Bronze Age, with permanently stationed garrisons that consisted of Egyptian officials and soldiers – the Greek mercenaries stationed in the southern Levant during the Saitic period (probably for a limited period of service) were

not allowed to marry local women. But I think it is the limited duration of the attested presence, which affects the archaeological record, that really matters here. We are not able to detect if the first wave of Egyptian soldiers stationed in Late Bronze Age Canaan brought their kitchen pottery with them. They probably did, but the centuries of Egyptian domination made it invisible in the archaeological record.

As a matter of comparison, one might consider the absence of Greek cooking pots at the site of Al Mina. This point was raised on numerous occasions by those who expressed doubt concerning the presence of the Greeks at this site, myself included (Waldbaum 1997; Niemeier 2001; Fantalkin 2001; Niemeyer 2004). I have changed my view on this particular subject, though. Scholars who pointed to the absence of Greek cooking pots at Al Mina attempted to compare this situation to East Greek pottery assemblages from sites such as Ashkelon, Mezad Hashavyahu and Tel Kabri, which yielded considerable quantities of Greek cooking pots. Methodologically, however, the imported assemblages from these sites should not be compared to those from Al Mina, which is a multi-strata site at which there is massive presence of Greek pottery over a rather lengthy period of time (between c. 825 and 600 BC during the Iron Age).⁹ The East Greek assemblages of the abovementioned sites in Palestine, on the other hand, reflect the chronological horizon of the end of the 7th century BC, a period of some 15–20 years only,¹⁰ which was “sealed” as a result of Babylonian destructions. Unlike long-lasting Egyptian domination of the southern Levant during the Late Bronze Age, this time Egyptian imperial aspirations were halted by the emerging Neo-Babylonian empire. As a result of this, this period of Egyptian interlude indicates a brief episode, remains of which have been preserved only due to particular and special circumstances – destructions and abandonment as a result of Babylonian activity and subsequent lengthy settlement gaps. In other words, the absence of Greek cooking pots at Al Mina does not necessarily weaken the claims of those who support Greek presence at this site (*e.g.*, Boardman 2005).

The Early Islamic period

My third example comes from the Early Islamic period. Following the Muslim conquest of the Levant, eastern Mediterranean trade patterns underwent significant, if gradual, changes (*e.g.* Walmsley 2000; Armstrong 2009). Egypt, however, remained a major player in the commercial networks of post-7th-century AD Palestine. A recent study has re-evaluated in detail the chronological aspects and distribution patterns of two main types of Egyptian coarse ware (Red-Brown Ovoid Amphorae and Coarse Ware Basins) identified in Early Islamic assemblages of the 8th–10th

centuries AD in Palestine (Taxel and Fantalkin 2011). It has been suggested that, while the distribution of Egyptian amphorae reflects regular trade relations such as the export of Egyptian sodium from Wadi Natrun, the appearance of Egyptian coarse ware basins in a limited number of local assemblages may imply the actual presence of Egyptian migrants (merchants or soldiers). These hand-made basins have thick (flaring or vertical) walls, rounded or flattened rims and flat bases, and were made of a typical Nile alluvium fabric, *i.e.* a reddish-brown clay (sometimes with a purplish-black core) mixed with abundant organic temper.¹¹

The morphological characteristics of these basins and their relative rarity in Palestinian assemblages make their identification as a desirable commercial product unlikely. Likewise, these open vessels were certainly not distributed for the sake of their contents. One may assume, therefore, that the occurrences of these wares in quite a limited number of Palestinian sites (mainly at Caesarea, Jaffa and Yavneh-Yam) may be associated with the presence of actual Egyptians (Taxel and Fantalkin 2011). While it is possible that these coarse wares represent the migration of a number of Egyptian merchants to some Palestinian seaports, another explanation may be linked to the fact that most harbours in Early Islamic Palestine also had a military function. A series of coastal fortresses was built at the beginning of the period of Islamic domination and continued to exist until its end. The importance of the Egyptian fleet for maintaining the network of coastal defences in Palestine increased significantly during the Fatimid period (10th–12th centuries AD) and involved the transport of Egyptian troops. It seems, however, that during the reign of the Tulunids (second half of the 9th century AD), and perhaps even earlier, a number of Egyptian soldiers periodically joined the local and foreign garrisons that manned Palestinian coastal fortifications. One may assume that these coarse types of Egyptian crockery were brought by members of Egyptian garrisons and/or merchants (with or without wives?), who settled at certain places along the Levantine coast.

Conclusions

Coarse kitchen and household pottery can certainly be a valuable trading commodity, as several well-known archaeological and ethnographic cases indicate.¹² In certain historical and geo-political circumstances, however, and in particular archaeological contexts, coarse kitchen and household pottery may be used (with caution) as a sensitive indicator concerning the nature and duration of the dominating regime in the colonised land. The presence or absence of imported or locally produced imitations of Egyptian coarse kitchen wares and certain types of

household pottery in Palestinian assemblages during the distinct time-periods discussed above (and for a certain period even Greek wares in the context of Egyptian domination), provides important information that may be useful as comparative perspectives for other localities and geo-political settings.

Acknowledgements

I wish to thank the editors of the volume for their kind invitation to attend the conference in the British Museum, as well as for their and the anonymous reviewers' comments on the manuscript of this article.

Notes

- 1 Although with regard to the Bronze Age, the first archaeologically attested Egyptian migration to Palestine took place already in the Early Bronze Age I and II, I cannot do justice to this phenomenon in the present limited framework. Suffice it to mention that Egyptian migration during the Early Bronze Age is a complicated process that consisted of a number of waves of migrations. Judging from the pottery assemblages and additional evidence at hand (such as architecture and other finds, mainly in the southern part and the lowlands of Canaan), some of the migrants underwent a process of acculturation to the local Canaanite milieu, while others, who seem to be the official representatives of the Egyptian authority, kept their identity (Gophna 1987; Brandl 1992; Braun 2002; de Miroschedji 2009; Greenberg 2011).
- 2 The environmental roots of the Late Bronze Age crisis have been recently emphasised anew in a number of studies dealing with different Mediterranean regions (Kaniewski *et al.* 2010; Drake 2012; Kaniewski *et al.* 2013; Langgut *et al.* 2013).
- 3 During the later stages of the Iron Age, this form of the Aegean cooking jug was gradually incorporated into the local ceramic repertoires of the Philistines' neighbours (Ben-Shlomo 2011; Ben-Shlomo *et al.* 2008).
- 4 This assumption is not necessarily based only on the notion that food preparation in the ancient world was primarily related to women (Marsman 2003, 164–165; Wilkins and Hill 2006, 76; Alcock 2006, 103), but also on a possible occurrence of an Aegean-style hairstyle in one of the Medinet Habu reliefs or, more importantly, on the occurrence of Aegean-style spoolweights, related to vertical looms used in weaving, in the Philistine sites (Yasur-Landau 2010, 177, 269–270). Although cooking is probably not as indicative as weaving for gender identification in household activities, Yasur-Landau (*ibid.*, 314) suggests that the Aegean-type cooking wares and installations found at some Philistine sites were used by women who tried to preserve their cultural identity by practising Aegean cooking traditions.
- 5 Indeed, the presence of Aegean-style pottery, figurines, loomweights, distinctive building techniques and especially the change in dietary habits attested in the Philistine sites adds weight to the theory of Philistine migration (*e.g.* Barako 2000; Dothan and Zukerman 2004; Killebrew 2005; Yasur-Landau 2010; Maeir, Hitchcock and Kolska Horwitz 2013). The name of the Philistine goddess Patagaya, as attested in the early 7th-century BC inscription discovered at Ekron, points in the same direction: it is not a west-Semitic name, but a name that probably derived from a Greek milieu (Demskey 1998; Schäfer-Lichtenberger 2000; Yasur-Landau 2001; see, however, Berlant 2008; Press 2012).
- 6 An interesting opposite comparison has been reported from the late Middle Kingdom/Second Intermediate Period site at Umm-Mawagir in Kharga Oasis in the Egyptian Western Desert. According to Darnell, based on the presence of two groups of Nubian cooking pots, those brought from Nubia and those made of local clays from Kharga Oasis, the Medjay mercenaries stationed there brought their pottery-making wives to the place of their service (based on the interview to Yale Alumni Magazine in 2010 [<http://www.yalealumnimagazine.com/articles/2979>]). I am grateful to one of the anonymous reviewers for this notice. For the most recent critical re-evaluation of the Medjay as an ethnic group and as mercenaries, see Liszka 2012).
- 7 Egyptian burials in anthropoid coffins, attested in great numbers at Beth-Shean and Deir el-Balah, but also at Lachish and Tel el-Far'a (South) (Gonen 1992, 28–30), may suggest (although not always) a rather lengthy stay of many Egyptian administrators and soldiers in the conquered land.
- 8 Until recently I, together with many others, have followed Na'aman's influential interpretation (1991), according to which the Egyptian expansion to the Levant following Neo-Assyrian withdrawal did not begin before 626 BC, following the rebellion in Babylon, which forced the Assyrians to withdraw their forces from the Levant, while the Egyptians took their place. New evidence, which came to light only a few years ago (Chauveau 2011), however, suggests that the Egyptians may have been already active in the Levant from at least 636/635 BC.
- 9 A well-known assumption that Sir C. L. Woolley did not keep plain and cooking wares is simply incorrect. A cursory search in the database of the British Museum produced more than 200 sherds of cooking pots from Al Mina that were catalogued almost 20 years ago. But from the count that I made it appears that there is a much greater number and one must assume that other sherds will be found in the future. All of these cooking pots clearly belong to the north Syrian milieu and some of them have been published by Lehmann (2005). Contrary to Hodos (2006, 39), who has claimed that two Greek cooking pots were identified at Al Mina Stratum VIII by Kearsley (1999, 128, n. 29), this is probably not the case, since their description in Woolley's pottery inventory is insufficient to determine the origin and, in any event, does not resemble Greek cooking pots (Kearsley 1995, 74–75, n. 248). It should be noted that based upon documentation and preserved pottery from Al Mina in the storehouses of the Institute of Archaeology at University College London, Woolley also kept large quantities of plain body sherds, belonging to local storage and serving wares. I wish to express my thanks to Alexandra Villing (curator of the Department of Greece and Rome at the British Museum) and Ian Carroll (Collections Manager of the Institute of Archaeology at University College London) for their invaluable help in studying the Al Mina collections.
- 10 Based on the ceramic evidence, even if the date of the beginning of Egyptian activity in the Levant during the days of the 26th Dynasty should be slightly updated upward, it seems that Egyptian centres of logistics on the coast of Palestine, serving as focal points for collecting supplies for the Egyptian troops on their way to the Lebanese coast and northern Syria and on their way back to Egypt, were not established before the twenties of the 7th century BC.
- 11 For contemporary Egyptian parallels, see Taxel and Fantalkin 2011, 92–93.
- 12 For instance, for Aeginetan Middle and Late Helladic examples,

see Lindblom 2001 and Gauss *et al.* this volume; for the wide distribution of Cypriote mortaria during the Archaic period, see Villing 2006; Spataro and Villing 2009; for imported Carthaginian cooking pots at some Iberian sites during the late 3rd century BC, see Sanmartí and Asensio 2005; for imported Italian cooking vessels during the late Hellenistic period in northern Israel, see Berlin 1993; for the wide distribution of North Syrian mortaria during the 3rd and early 4th centuries AD, see Hayes 1967; for wide distribution of Syrian cooking wares (generally called *Brittle Ware*), from the late Hellenistic to the Umayyad periods, see Vokaer 2011; for the special reputation of Siphnian cooking wares until the present, see Vroom 1998, 145–146 and especially Kyriakopoulos this volume.

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KITCHEN POTTERY FROM IRON AGE CYPRUS: DIACHRONIC AND SOCIAL PERSPECTIVES

Sabine Fourier

The study of Iron Age kitchen pottery has long been neglected in Cypriot archaeology. In his seminal work on the material culture of the island, Gjerstad devoted two plates only, placed at the end of the volume, to the coarse ware ceramics, among which he included some cooking pots, without arranging them in a chronological frame (Gjerstad 1948, pls. LXX–LXXI). Little progress has been made since, notably because no Iron Age settlement has been properly excavated and published (Pilides 2005; Spagnoli 2010). Besides, no extensive programme of physico-chemical analysis has been applied to this kind of ceramic ware.¹ This is largely due to the predominantly art-historical and historical approaches to the study of this period (see Reyes 1994), as well as the usual concentration on tombs, sanctuaries and high status buildings by archaeologists.

However, as is often the case in the archaeology of the island, new insights into the potential value of kitchen pottery for reconstructing history have resulted from a new approach to the material culture of Late Bronze Age Cyprus. Archaeologists now try to detect migrations and to find archaeological testimonies of the so-called “Hellenisation” phase of Cyprus also in the profound changes that affected domestic assemblages (artefacts related to eating, drinking and clothing).²

Yet this ethnicity-focused interpretative framework does not take into account the *longue durée*: it concentrates on particular moments of change and the possible explanations for them. It does not examine Late Bronze Age cultural innovations in their full cultural context,³ and it dismisses the subsequent (post-early 1st millennium BC)

changes that also affected the Iron Age kitchen pottery repertoire of Cyprus. Similar-seeming evolutions may have quite distinct causes, and univocal explanations are always too simplistic. Changing through time, culinary habits (that is, not only dietary practices but also gestures and spaces, and ways of preparing, presenting and consuming food) also change according to social environment, as demonstrated by anthropological studies.⁴ This paper does not seek to impose alternate views on a heavily debated theme; rather, by adopting a diachronic and a social perspective on the *longue durée* of the Cypriot Iron Age, it aims to challenge current interpretations in favour of a more nuanced view. As a matter of fact, any explanation must remain highly speculative because of the unsatisfactory state of the primary evidence, which comes almost exclusively from tombs.

A diachronic perspective: Aegeanising versus Orientalising

From the 12th century BC onwards, new kitchen pottery types enter the Cypriot repertoire and new, Aegean-type vessels eventually replace the older, insular and Levantine-type shapes (Jung 2009, 80–81; Jung 2011). Other ceramic “innovations” enter the Cypriot repertoire at the same time: most importantly, wheel-made wares replace the traditional hand-made Late Bronze Age wares (Base-Ring and White Slip). As far as fine wares are concerned, this phenomenon, once considered positive proof of a massive Aegean immigration to Cyprus, has been interpreted in a

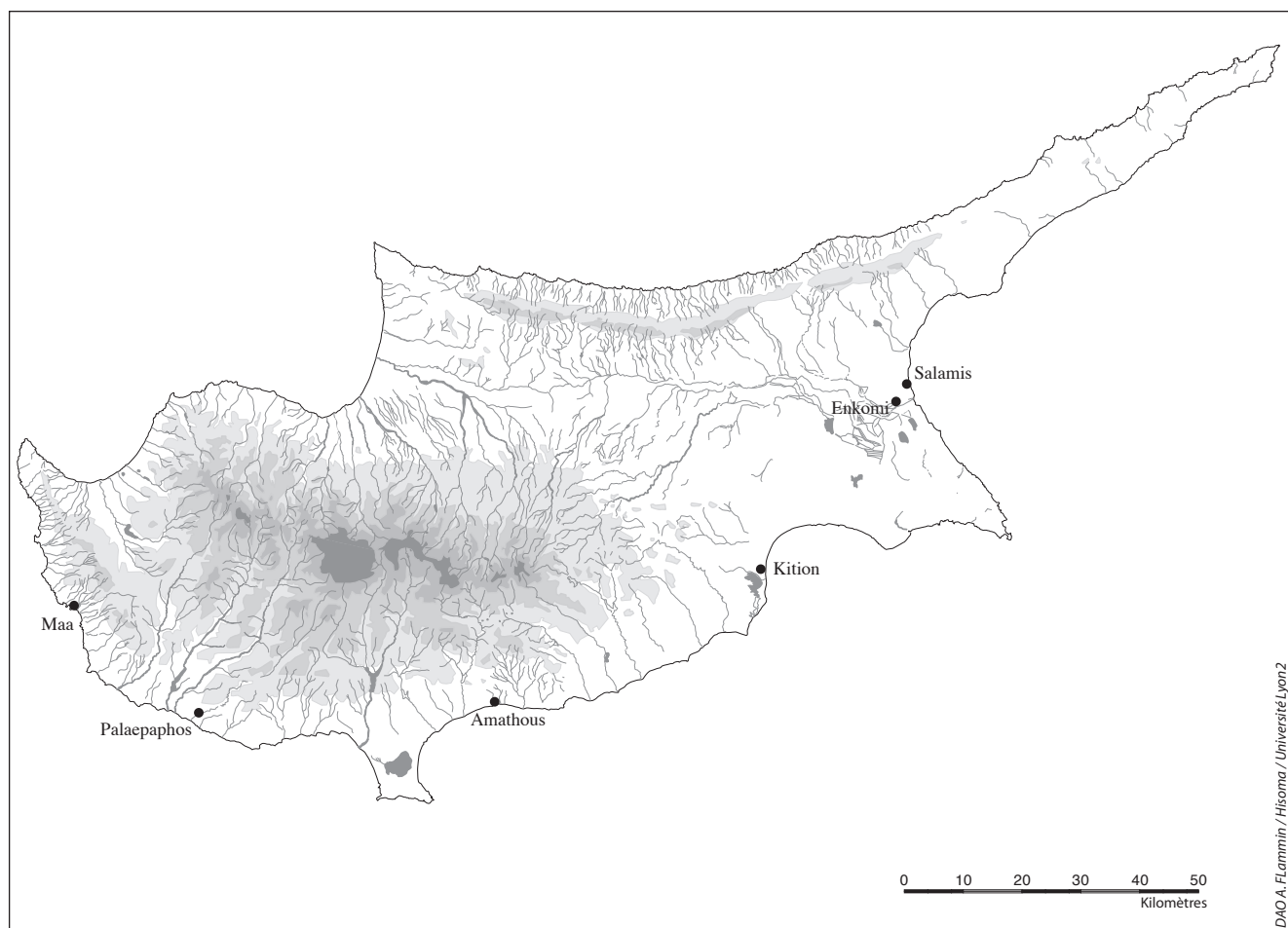


Figure 22.1. Map of Cyprus. Drawing A. Flammin, HiSoMA-Université Lyon2.

more nuanced way in the last decades (Sherratt 1991 and 1992; Iacovou 2005). The kitchen pottery evidence – barely studied until very recently – was not part of the debate. Interestingly enough, it is now widely used by those who argue for a massive migratory episode to Cyprus in the 12th century BC.⁵

New kitchen pottery types are also attested in contemporary contexts in the southern Levant, but on a more restricted scale, both geographically (the Philistine cities) and chronologically (Killebrew 1999; Yasur-Landau 2005; Ben-Shlomo *et al.* 2008). In Cyprus, this change in the everyday pottery repertoire affects all settlements, from temporary ones (Maa) to centuries-old cities (Enkomi) (Fig. 22.1; Jung 2011), and it is a long-term change. The Geometric kitchen pottery repertoire (11th–10th centuries BC) from Cyprus is definitely Aegeanising and it is remarkably homogeneous in all regions of the island.⁶ First defined by Karageorghis in his study of the Palaepaphos-Skales tombs⁷ on the western coast, this repertoire is also attested in the

Geometric necropolis of Kition,⁸ on the southeastern coast of the island, for example (Figs. 22.2–22.4).

All vessels are wheel-made on a fast wheel. Although the fabric varies according to workshops, all cooking vessels share common characteristics: their walls are quite thin, and, although their fabric is specific to kitchen pottery (and very distinct from fine but also common wares), it is far less coarse than that of the preceding Bronze Age pots, and also that of the subsequent Archaic cooking wares: the pots have a relatively fine clay with small inclusions. Soot-marks demonstrate beyond doubt that vessels found in funerary contexts were actually used as cooking implements. Their presence in funerary assemblages testifies to a secondary use.⁹ The repertoire comprises three main shapes: the jug (Fig. 22.2), the amphora (Fig. 22.3) and the cooking pot (Fig. 22.4).

The first two categories are similar, the only difference being that the amphora is usually slightly bigger and possesses two handles. The vases are globular, with a



Figure 22.2. Cypro-Geometric cooking jugs from Kition, MLA 1065/84 and 89. Photograph S. Fourrier, Courtesy Department of Antiquities of Cyprus.



Figure 22.3. Cypro-Geometric cooking amphora from Kition, MLA 1065/82. Photograph S. Fourrier, Courtesy Department of Antiquities of Cyprus.



Figure 22.4. Cypro-Geometric cooking pot from Kition, MLA 1065/94. Photograph S. Fourrier, Courtesy Department of Antiquities of Cyprus.

cylindrical neck and a rounded rim. Their average height is around 25 to 30 cm and they have a flat or disc base. This base allows the vases to stand steadily, and this feature, along with the soot-marks, which are always located on one side of the vessels, has been taken as evidence that they must have been placed next to the heating source and not



Figure 22.5. Cypro-Archaic cooking pots from Kition, MLA 9/5 and 7. Photograph S. Fourrier, Courtesy Department of Antiquities of Cyprus.

directly on or in the fire. The pots would have stood on a flat surface, near the pile of embers, thus suggesting the use of built hearths (Ben-Shlomo *et al.* 2008, 236–238; for similar developments in 12th-century BC Lefkandi see Lis this volume, fig. 9.2). Built hearths are a cultural innovation in 12th-century BC Cyprus and they are considered to be of Aegean origin (Karageorghis 2011, 22–23). The heating installation used in Cyprus before the 12th century BC (from the Early Bronze Age onwards) and after the 9th century BC (as far as we can judge from the vessels' shape, soot-marks and from later iconographic representations) is the open hearth.¹⁰ No domestic quarters have been systematically excavated in Iron Age settlements on Cyprus, though, no domestic Iron Age cooking hearth has been published and we are thus compelled to use indirect testimonies, such as for example iconographic representations and the soot-marks left on the cooking pots, to understand what kind of hearth may have been used in domestic contexts.

According to Ben-Shlomo *et al.*, Aegean-type cooking jugs would have been used for “slow, low-heat cooking (simmering) of liquid dishes” (Ben-Shlomo *et al.* 2008, 237). Their reasoning is based on the “size, shape and wall thickness” of the jugs, some of which may have been made in the same fabrics as other non-cooking classes of pottery. As far as we can judge by eye, the fabric of the Cypriot cooking jugs is specific: as a matter of fact, it constitutes the main criterion of identification for fragmentary vases. Made of refractive fabrics, thin-walled pots would allow a rapid transmission of heat, unlike heavy-walled pots, and they would thus be suitable for rapid, high-temperature cooking. This is also suggested by comparative evidence, especially from Hellenistic and Roman times.¹¹ So I would

suggest that the Cypriot “Aegeanising” cooking jugs were employed for boiled, rather than stewed, preparations.

The final shape, which is much scarcer in the tombs than the jug and the amphora, is the Levantine-type cooking pot (Fig. 22.4). It is a common Cypriot and Levantine Bronze Age shape. The main differences lay in the fabric and in the manufacturing technique. The vessel's rounded base and large mouth, covered by a lid, make it particularly well adapted for stewing.¹² But a closer examination shows that its fabric and manufacturing technique are the same as those of the “Aegeanising” jugs and amphoras. Besides, soot-marks, on one side only, suggest that the pot was not placed directly in the fire, despite its rounded base, but rather close to the fire, presumably on a built hearth. As already mentioned above, direct evidence from the Early Bronze Age, and indirect evidence (mostly 6th-century B.C. iconographic representations) from the later Iron Age, show that the Cypriots traditionally cooked in pots that were placed on stands directly in the fire. The round bottoms of the Levantine-type cooking pots would make them unsuitable for use on a flat surface: the shape is Orientalising, but the way the vessels were used is Aegeanising.¹³

A new, radical and reverse change occurs in the Cypro-Geometric III period (9th century BC). From then on, the cooking vessel *par excellence*, in all regions of Cyprus, is the cooking pot (Fourrier 2007, with references). This is a long-term change, which lasts until new kitchen pottery types progressively enter the repertoire in the Hellenistic period. The vase has a rounded base, a short cylindrical neck and a round or triangular rim (Fig. 22.5). It was made on a slow wheel, using the coils technique. The soot-marks cover the whole surface of the vase, and the often heavily

burnt base shows that the vessel was placed directly on the fire, presumably on a stand.¹⁴ As already noted, such a shape was particularly suitable for slow cooking (stewing).¹⁵ It is a Levantine shape used in a Levantine way.¹⁶

Two major disruptions thus marked the repertoire of Cypriot kitchen pottery. In the Late Cypriot IIIA period (12th century BC), the heavy-walled, hand-modelled and round-bottomed cooking pots of longstanding Levantine tradition were replaced by thin-walled, wheel-modelled and flat-bottomed cooking jugs of Aegean type. This new repertoire was adopted in all regions of the island and it remained in use for at least three centuries. The “Aegeanising” cooking jugs were then replaced, in the course of the Cypro-Geometric III period (9th century BC), by heavy-walled, coiled and round-bottomed cooking pots of Levantine tradition. This new repertoire was adopted in all regions of the island and it remained in use for around six centuries, until its replacement by Hellenistic types. Same causes, same effects? The answer is obviously not straightforward. As mentioned above, the adoption of new Aegean-type kitchen pottery in the Late Bronze Age has been claimed by some scholars to corroborate the reality of a massive migratory episode to Cyprus (Jung 2011, especially 69–72). Can the same explanation be valid for the change that occurred in the 9th century BC? Is the hypothesis of a massive Phoenician migration to Cyprus sustainable? It is not supported by the archaeological and epigraphic evidence. Written testimonies, in particular, show that Cyprus remained, for the whole Iron Age, a predominantly Greek-speaking island. Some Levantine people certainly settled in Cyprus in the 9th century BC, notably in the area of Kition (Cannavò 2011, 482–493), but this rather limited migration did not lead to a demographic shift in favour of Phoenician-speakers. It appears to have had real and profound effects on culinary practices, though, as is demonstrated by the kitchen pottery repertoire.

The Iron Age evidence should thus prompt us to adopt a more cautious approach to what may have happened on Late Bronze Age Cyprus. I doubt that the realm of “everyday” life is as conservative a sanctuary of “ethnic” customs as claimed by some scholars;¹⁷ rather, like other realms of domestic and social life, it is a cultural construct. As such, it may reveal contacts and acculturation. The “pots = people” theory has been abandoned for fine wares; the new “cooking pots = people” theory should also be abandoned or, at least, nuanced.¹⁸

A social perspective: sanctuaries and palaces

As already stated, contextual studies are few in Cyprus, because the evidence itself is limited. No Early Iron Age

settlement has been excavated and published and so we have no evidence of cooking ware assemblages from domestic contexts. The Cypro-Geometric assemblages come almost exclusively from tombs. Nevertheless, the kitchen pottery vessels and bronze skewers, deposited among other prestige artefacts, such as weapons and bathtubs, show that communal meals, implying in particular the sharing of meat, were an integral part of elite practice.¹⁹ The deposition of similar cooking implements, two centuries later, in the “royal” tombs of Salamis reveals a remarkable consistency of elite practices during the whole Cypriot Iron Age.²⁰

New evidence from recent excavations at Amathous helps us to go one step further and make a contextual comparative analysis. Kitchen pottery can thus be studied in its primary context of use, and not only in its secondary deposition as part of a funerary assemblage. Two contemporaneous Cypro-Archaic II ceramic deposits (6th century BC) have been found at Amathous: one on the acropolis, in the Aphrodite sanctuary;²¹ the other at the foot of the Classical and Hellenistic city wall, at the northern limit of the lower city.²² This last assemblage was a refuse deposit from the acropolis royal palace, as demonstrated by the discovery of joins between sherds found *in situ* in Cypro-Archaic layers during the palace excavations and other pieces found in the deposit. Both assemblages result from destructions that affected both the sanctuary and the palace at the time of the Ionian Revolt, probably when Onasilos of Salamis besieged the city (499–498 BC).

Kitchen pottery is attested in both assemblages, but the divergences are many. The first one is quantitative: cooking wares represent less than 1% of the total ceramic assemblage in the sanctuary, but they represent 10% in the palace. The second difference is qualitative: the sanctuary cooking set is very limited, compared to the much more varied palace equipment. It chiefly comprises cooking pots of small dimensions, with an average height of c. 20 cm. Cooking pots also represent the most common shape in the palace assemblage (80% of all cooking vessels), but they show morphological variations, especially in the shape of the rim. Besides, some very big examples (c. 50 cm high, Fig. 22.6) demonstrate that food was processed for large groups of people. Other kitchen pottery shapes are attested (plates, jugs, pans), some of which are barely known from other contexts. With the exception of certain pottery types, whose use is documented by other testimonies (chiefly iconographic representations), it is often difficult to know what was cooked and/or prepared in what ceramic shape. But various cooking recipes may correspond to the varieties of shapes. Of special interest are the fragments of grills that suggest the practice of roasting meat (and/or fish?) (Fig. 22.7).²³

The proportional importance of kitchen equipment in

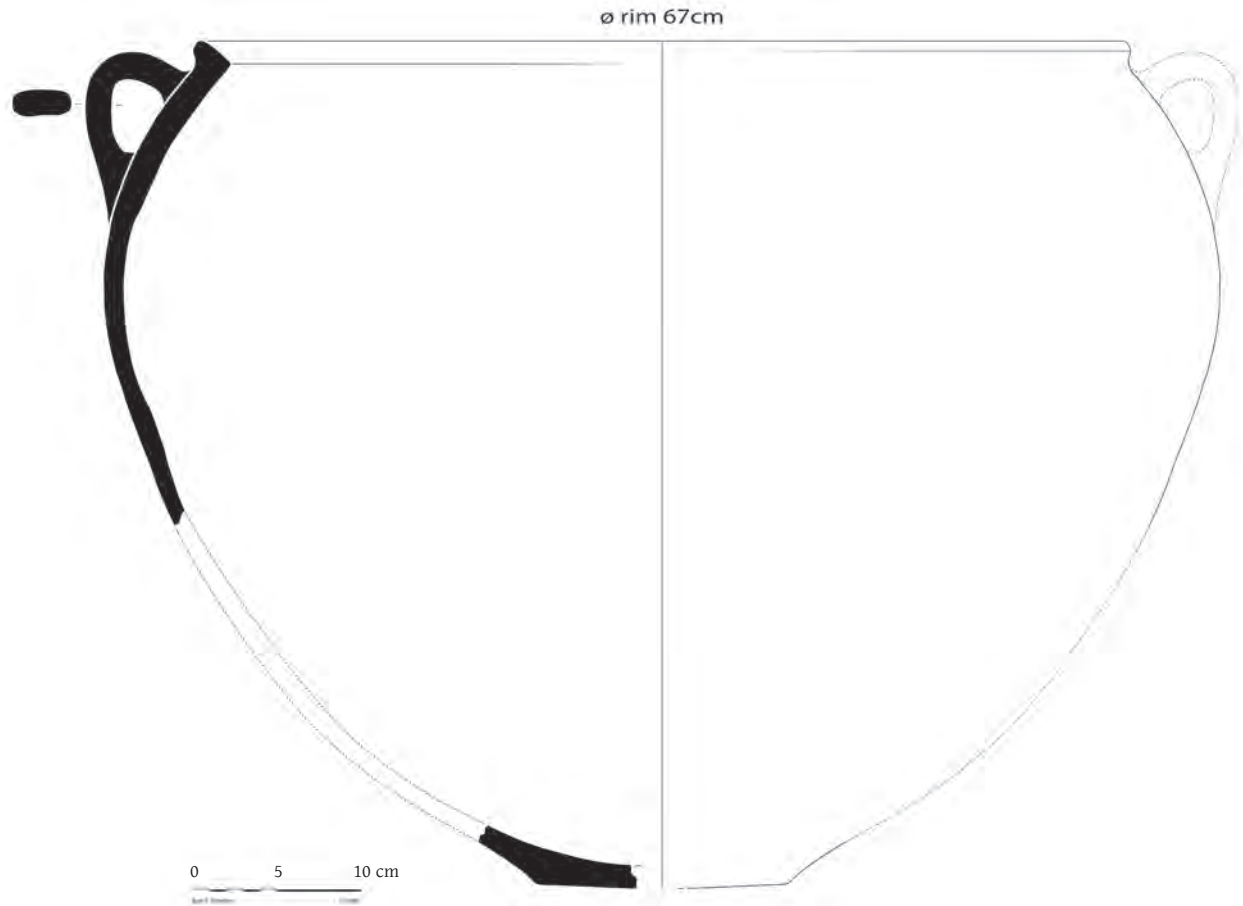


Figure 22.6. Cooking pot from Amathous, 6th century BC, dépôt du rempart Nord, inv. d/cw.11. Drawing J. F. Humbert, Courtesy École française d'Athènes.

the palace assemblage, as well as the quality and variety of vessels, show that cooking food for communal meals – feasting, in anthropological terminology – was a regular practice in the palace. This is amply confirmed by Greek sources that describe the lavish banquets of the Cypriot kings, and in particular of the kings of Salamis in the 4th century BC.²⁴ The evidence does not suggest anything similar for the sanctuary. More evidence is needed: the publication of faunal remains and of cooking wares from other sanctuary and palace contexts may nuance this conclusion based on Amathous alone, but I doubt that it will profoundly alter it. Communal meals, and especially the sharing of meat, remained an elite's practice in Cyprus that did not leave the realm of the elite (effectively in the palace, allusively in the tomb). It explains why cooking pots were such a suitable funerary gift for a king, be it at Palaepaphos in the Early Iron Age (Karageorghis 1983) or at Salamis in the Archaic period (Karageorghis 1974), among weapons, chariots and bronze cauldrons. Cooking wares are barely attested in ordinary Cypriot Geometric and Cypro-

Archaic tombs. They are numerous in elite tombs, among prestige artefacts. It may appear paradoxical, but only at first sight. In fact, cooking pots hint at another royal activity, along with royal practices such as war, hunting and bathing:²⁵ feasting.

Feasting, in past scholarship, has traditionally been viewed through the lens of drinking and fine wares, rather than eating and coarse wares, and it is instructive to end this survey with a look at contemporary developments in drinking vessels. At the end of the Late Bronze Age (12th century BC), new types of drinking vessels, of Aegean derivation, were adopted in Cyprus: the first is a medium-deep bowl with carinated shoulder and two horizontal handles (*skyphos*); the second has a long stemmed foot and a vertical handle (*kylix*).²⁶ The *kylix* disappears quite early in the Cypro-Geometric I period, but the *skyphos* remains the most common drinking vessel of the Cypriot repertoire until the 9th century BC. From the Cypro-Geometric III period onwards, however, its supremacy is challenged by new Levantine shapes, in particular deep handleless

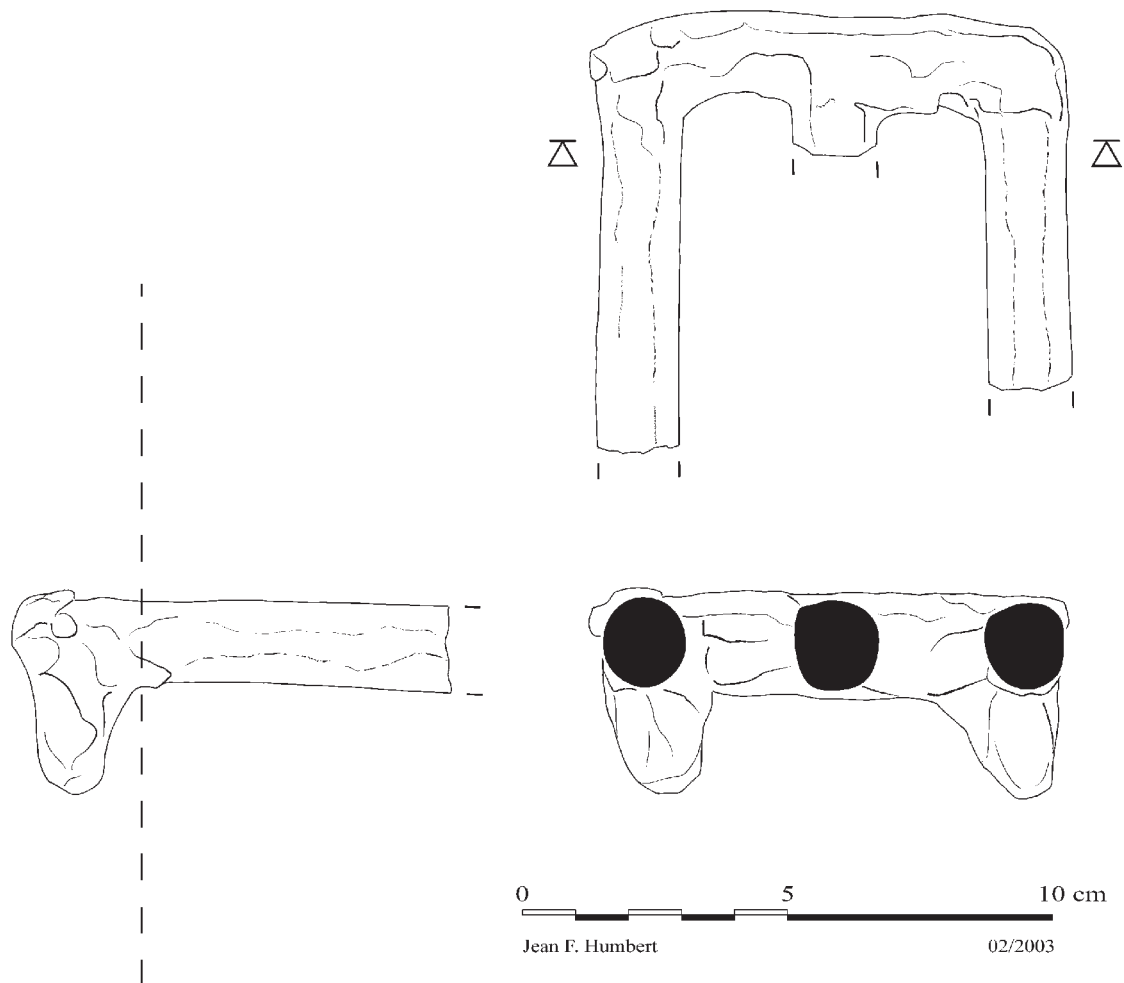


Figure 22.7. Terracotta grill from Amathous, 6th century BC, dépôt du rempart Nord, inv. po.1. Drawing J. F. Humbert, Courtesy École française d'Athènes.

cups (Fourrier 2009, 131–132). This change is reflected in contemporary images. At the beginning of the Iron Age, drinking men are always depicted using footed deep bowls that they grasp firmly by the stem. Among the rare Geometric representations in vase-painting, the *kylix*, a rare Aegean shape, is over-represented.²⁷ In the Cypro-Archaic period, people are shown reclining for banquets in the Oriental way and holding their handleless cup in the open palm of the hand.²⁸

Drinking vessels, just as cooking wares, were thus subject to both Aegeanising and Orientalising influences; conspicuous consumption – in the shape of drinking and feasting – remained of social significance across time. The status of kitchen pottery in contexts of the elite (“warriors” and “royal” tombs and palaces) appears to remain remarkably consistent throughout the whole Iron Age. Feasting in Cyprus, it seems, remained a habit of the

elite; apparently it did not leave the kings’ realm. This is another indication of the stability of Iron Age Cypriot polities that did not experience, at least in the Iron Age, the long maturation process of the Greek city, from rulers’ dwellings to temples.²⁹

Notes

- 1 A new programme (ER02 Fellowship, “Mechanical and thermal behaviour of functional ceramics in the Aegean and Cyprus”), launched within the NARNIA (New Archaeological Research Network for Integrating Approaches to Ancient Material Studies) project is now filling the gap: <http://narnia-itn.eu>. We also ought to mention an ongoing interdisciplinary project coordinated by A. Vionis (University of Cyprus/Leventis Foundation): *Stirring Pots on Fire Project*.
- 2 That was the theme of an international conference recently published: Karageorghis and Kouka 2011. The book strongly

- supports a migrationist perspective. On the problem of the “Hellenisation of Cyprus” and on the historiography of the concept, see Fourrier 2008.
- 3 See similar remarks by Sherratt 1991 on the appearance of “Aegeanising” fine pottery on Late Bronze Age Cyprus.
 - 4 For example Dietler and Hayden 2001.
 - 5 Karageorghis and Kouka 2011, especially Karageorghis’ introduction, 19–28.
 - 6 The same remark applies to fine wares: the whole material culture of Early Iron Age Cyprus is typologically and stylistically homogeneous (Iacovou 2005). Fabrics, however, point to local workshops.
 - 7 Karageorghis 1983, 368.
 - 8 I would like to thank the successive directors of the Department of Antiquities of Cyprus, Dr P. Flourentzos and Dr M. Hadjicosti, for permission to study material from the Geometric necropolis of Kition.
 - 9 Nothing is known of possible funerary rites that would have implied the use of cooking vessels.
 - 10 On hearths and hobs from Early Bronze Age Cyprus, see Webb and Frankel 2011. For a terracotta representation dated to the 6th century BC, see Fourrier 2007, 93, fig. 24.
 - 11 Thin-walled jugs used for boiling are well attested in the Roman kitchen pottery repertoire: for example, Hayes 1997, 82.
 - 12 The shape of the Levantine-type cooking pot, with its wide opening, rounded bottom and thick walls, is very close to the modern Cypriot “tavas” pot, used for stewing: Yon 1985, 109, fig. 7c and 114, fig. 12. Thick walls would allow a slower and longer-lasting transmission of heat.
 - 13 Other ways of cooking, which do not require the use of kitchen pottery, are also attested in Cypriot Geometric tombs: roasting was a common practice of the elite, as demonstrated by the *obeloi*, spits, found in Geometric tombs (Karageorghis 1983, 75). Barbecue is the standard method of cooking in Greek epic (Sherratt 2004).
 - 14 This way of placing the vessel on the fire is confirmed by terracotta representations: Fourrier 2007, 93, fig. 24.
 - 15 This is also suggested by ethnographic parallels: see n. 12 above. For round-bottomed cooking-pots in the Levant, see Lehmann 1996, pls. 83–87.
 - 16 This way of cooking is attested in Cyprus from the Early Bronze Age onwards, for example at Marki-Alonia: Frankel and Webb 1994 and 1997, 99–102.
 - 17 See, for example, Ben-Shlomo *et al.* 2008, 227: “these vessels reflect distinct cooking practices and eating habits, both of which usually represent conservative behavioural patterns”; Jung 2011, 69: “I find it difficult to suggest that such a radical eclipse of traditional habits and the substitution by foreign habits (...) occurred without the presence of a considerable number of immigrants from the Aegean”.
 - 18 Much progress has been accomplished in the last decades towards a better understanding of the “Aegeanising” fine wares in their Cypriot milieu: see Sherratt 1991 and Fourrier 2008, with references. The recent use made by some scholars of kitchen pottery (as reflected by the proceedings of the Nicosia conference: Karageorghis and Kouka 2011) represents, in many respects, a return to old theories.
 - 19 Cooking pots are remarkably numerous in elite tombs of the Early Iron Age: Karageorghis 1983.
 - 20 Cooking pots figure prominently among the funerary deposits of Salamis “royal” tomb 79: Karageorghis 1974, pls. L–LI. Iron fire-dogs and skewers were found in the same tomb: *ibid.*, pl. LVIII.
 - 21 The “dépôt de la grotte”, published by Fourrier and Hermay 2006, 111–126.
 - 22 The “dépôt du rempart Nord”; the kitchen pottery was published in Fourrier 2007, with references.
 - 23 No fish bones have been found in the deposit, though. Bovid, caprid and pork bones from the assemblage show butchery traces: Gardeisen 2006.
 - 24 Chavane and Yon 1978, 129–131 (Nicocles); 144–146 (Nicocreon).
 - 25 Sherratt rightly insisted that the cauldrons mentioned in the epics were used to heat water for washing and not cooking: Sherratt 2004, 314.
 - 26 Review of the evidence in Karageorghis and Kouka 2011.
 - 27 On the “Aegeanising” flavour of those representations, see Sherratt 1992.
 - 28 Examples are too numerous to be listed and they are found in various media: terracotta figurines (Fourrier 2009, 137, fig. 2b), vase-painting (Karageorghis and des Gagniers 1979, 6–9), funerary reliefs (Pogiatzi 2003, 69), bronze and silver bowls (Markoe 1985, 171–176: Cy 3, Cy 5 and Cy 6). The sole remarkable exception is on a “Amathous Style” amphora from Archaic Amathous: Karageorghis and des Gagniers 1974, 516–517, no. 13. The style of this vase is of East Greek inspiration, and the shape of the cups held by the banqueting men is close to Chiot chalices.
 - 29 To quote the title of Mazarakis Ainian’s book 1997. This is the thesis put forward by M. Iacovou in many seminal articles, for example Iacovou 2007 and 2008.

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POSTSCRIPT

LOOKING BEYOND
ANTIQUITY

AEGEAN COOKING-POTS IN THE MODERN ERA (1700–1950)

Yorgos Kyriakopoulos

1. Introduction

Although stormed by ethnic, religious and sovereignty changes from Late Antiquity onwards, little changed socio-economically in the lands around the Aegean and on its islands up until the last quarter of the 18th century. Historiography generally accepts that the beginning of modernity in this part of the Mediterranean is roughly marked by the Treaty of Küçük Kaynarca (1774) and the influx of mercantile capital associated with it. Trade changed the Aegean socially and politically within two generations, as much so in the Kingdom (Greece, since the 1830s) as in the European provinces and the Western Anatolian coasts of the declining Ottoman Empire (Turkey, since the 1920s). And yet, in quite a few poorer and isolated areas, seemingly frozen in time, change had to wait for another 180 years, until the early 1950s and the post-war booming of secular education, transportation, electricity and the introduction of cheap industrial commodities. Aluminium, glass, running water, refrigeration, the abundance of non-local goods available to each household, the internationalisation of tastes and recipes via tourism and television and finally the relaxing religious rules regarding both fasting and feasting, ultimately changed the old cuisine beyond recognition, again within the space of two generations.

Mourning the loss of diversity in this world of a single global culture should not allow us, however, to bypass one important benefit: the means of modern life, like photography, filming and video, have given us the opportunity to record the production – and sometimes also the use – of ceramic vessels, whose umbilical cord

with a very distant past was strong (and in some cases perhaps uninterrupted) up until some fifty years ago. And a learned and careful use of this “continuum” may prove indispensable for the study of antiquity in this region.

This paper endeavours to shed light on the production methods, the forms and the various uses of ceramic cooking pots, the *tsoukalia* (*tsoukali* or *tsikali* being the generic name for cooking pot in medieval and modern Greek) in the pre-industrial Aegean, while associating them with the dietary and culinary habits of their time.¹

Methodologically, this raises questions about the temporal and geographical span of the term “pre-industrial” itself. Statistically, the percentage of the population of Greece that was employed in industry and services was larger than that employed in farming and livestock breeding already before the 1950s. But the structures of domestic economy did not follow the statistics close enough. It can be legitimately assumed that the 18th century survived well into the 20th despite the changes. This is equally valid for an industrialised city on the mainland coast as it is for a forgotten little island or a remote mountain village. The fact itself, that potters continued to produce cooking pots in large numbers until well into the 1950s, means that there was a market for them. And the market need was equally lively in the remote areas “frozen in time”, as it was with the population that moved from these areas to the emerging industrial urban centres to form, from the 1860s onwards, the country’s working class. The fact that the largest traditional pottery workshops were newly founded – and thriving – in the most heavily industrialised cities of the Aegean, like Athens, Piraeus, Thessaloniki, Lavrio, Volos and Chalkida,

offers an incontestable testimony to this reading of social micro-history. It will therefore be assumed that, regarding pottery-making at least, the Aegean is technically one area (be it mountain or plain or coast or island) and the time span of two and a half centuries is in more respects a homogeneous period than a dynamic one.

Examining the continual production, the forms, the uses and the nomenclature of the Aegean cooking pots, a more or less arbitrary time frame had to be selected. The period chosen is from 1700 to 1950. The starting date is symbolic, since in the year 1700 we have the earliest written reference to the *tsoukalia* of Siphnos,² an island that has been the most successful producer and exporter of such vessels during the said period. The closing date, on the other hand, is more or less random, but coincides broadly with the expansion of the use of aluminium vessels in the area. It remains a fact, that several production centres, including Siphnos, continued to produce cooking pots after that date. And indeed they still produce them today, despite the serious compromises in the clay used, the throwing and firing techniques employed and the differences in size. But numbers are heavily declining and the limited use of them is selective and perhaps romantic.

2. *Prosfai*: a bread culture dictating the size of cooking-pots

Up until the last quarter of the 18th century, the diet of the Greeks was more or less in the pattern of any relatively poor Mediterranean area.³ With the exception of Sundays and the great Christian feasts, the name-day of the members of the family – and particularly that of the master of the house – and also the days of travel and the nights of mourning or illness, meals were plain and based mainly on bread. The role of bread as main course is adequately documented in human manifestations as diverse as faith and literature, icon-painting and fairy-tales, the architecture of mills and ovens, the cultivation of land devoted to barley and wheat, the surviving recipes and so on. When people pray for their “daily bread” they – and so do we – understand “daily food”.

Eloquently enough, any food accompanying bread was called *prosfai*,⁴ i.e. secondary food. And *prosfai* rarely consisted of fresh meat or fish,⁵ more often consisting as it did of dairies, like cheese and yoghurt, eggs, olive-oil and olives, thick gruel soups and pasta,⁶ rice, broad-beans, chickpeas, split peas and lentils, vegetables⁷ and fruit, herbs (fresh or dry), artichokes, turnips, greens⁸ and mushrooms, garlic, onions and leaks, different versions of pitta,⁹ pickled capers and other preserves in brine or vinegar and less often cured fish and meat (mainly pork

and game¹⁰), sausages, dried snails and, of course, sea-food, particularly octopus, squid and cuttlefish, where available. Indispensable additives included dry fruit (figs, walnuts, almonds, roasted chickpeas) and chestnuts and sometimes berries picked in the wild. Honey and grape-must, fresh or reduced and preserved, and later on also currants and sugar, were the main sweeteners, although sweets, like syrupy cakes, *halva*,¹¹ fried *diples* and *samousades* (thin pancakes soaked in honey, often sprinkled with crushed nuts or almonds), macaroons and biscuits (*koulouria*), *moustalevria* (grape-must and flour pudding), quince jelly and fruit preserves, were common, but rare, even in the great feasts. Fasting days were no exception to the described diet, except of course in that they obeyed strict rules on forbidden ingredients. Some religion-related recipes were more strictly observed, and that was done at any cost. For example, *kollyva*¹² for the fortieth day memorial of the deceased, *gamopilafo*¹³ for both weddings and funerals in Crete, fish-soup for the night of mourning in Skyros and elsewhere, *mageiritsa* (lamb liver and intestines soup) and red-dyed eggs for the Easter night, Easter biscuits, usually called *koulouria tis Lambris* or *Lazaroi* (plural of Lazarus) or *Lazarakia*, the *christopsomo* (a spiced sweet bread with a cross decoration) for Christmas, *lagana* (unleavened bread) for the first Monday of Lent and so on were executed by any Christian household, no matter what economic or other hardship.

Contrary to what one might expect, this food repertoire differed only slightly between religious groups,¹⁴ between town and countryside (with one major exception: access to spices and sometimes sugar), between wealthier¹⁵ and humbler households or between the different members of the household, including children.

Self-sufficiency on one hand and exchange of food on the other, both worked almost exclusively in the countryside. In towns and less densely populated cities it was the inner garden or back yard of each house or any nearby plot of land that hosted the kitchen garden (*baksēs*)¹⁶, which often provided most of the vegetables needed and some fruit, especially the family lemons (altitude permitting), as well as eggs, milk and meat from the few birds and animals that could be kept domestically (usually one pig and/or a ewe or a goat, some hens and perhaps a few rabbits). Yoghurt, smoke- and salt-cured meat and pasta were also home-made as a rule.

On the contrary, within the rural areas themselves – and their nearby townships – there was a marked differentiation in dining habits between mountain and plain, between continent and coast. This had to do principally with the consumption of olive-oil versus animal fat and butter;¹⁷ but also with the degree of the consumption of dairies, cereals, fruit and vegetables¹⁸ and of course fish and seafood.¹⁹ However, once on the table – or rather the *sofra*²⁰ – all



a



b

Figure 23.1. Type G large cooking pots for making lamb on special occasions: a) unglidded *mastelo* from Cheronissos, Siphnos, c.1980; b) lidded *rifiko* or *rifoletani* from Archangelos, Rhodes, c. 1990.



a



b



c

Figure 23.2. a) Brazier (*foufou*) from Siphnos, c.1940; b) *bondza* from Thrace, second quarter of the 20th century; c) *pittoplaka* or *sadzik* from Kornos, Cyprus, c. 2000.

differences had to do with the *prosfai* alone; bread was invariably the main course.²¹

Prosfai, cooked or uncooked, was prepared in small quantities and should often be liquid enough (be it a soup

or a sauce) to allow for soaking bread in it. That is why, in households across the Aegean we see an almost identical use of small tableware, usually coarse and undecorated, consisting predominantly of *koupes* (the word denoting



Figure 23.3. a) Type A *tsikali* from Kamares, Siphnos, third quarter of the 20th century; b) Type A *tsikali* with higher walls from Kamares, Siphnos, third quarter of the 20th century; c) Type B *plakero tsikali* from Thrapsano, Crete, third quarter of the 20th century; d) Type C *tsikali* from Lesbos, third quarter of the 20th century; e) Type C *tsikali*, unique variant from Artimoni, Siphnos, Fyssas Workshop, dated 13 June 1948. Charming excessive branding, with the workshop stamp being used decoratively in the shape of a flower.

the bowl, introduced from Latin into mediaeval Greek) and *pinakia* (from ancient Greek *pinakion*) bowls for the *prosfai* – besides, of course, oil and vinegar dispensers, mugs, small jugs, pitchers and ewers. Their numbers had

always been very limited,²² as is so clearly highlighted in the very detailed lists of tableware found in the few published testaments of the 16th through to the 18th centuries (e.g. in Asdrachas 2003).

The same holds true for kitchenware. In marked contrast with the storage room (usually in the cooler basement²³), where large storage jars were kept to provide for the family needs in olive-oil, olives, grain, wine, vinegar – and sometimes also water, kitchens had but small vessels. A few small or medium storage jars,²⁴ barely covering the surface of a couple of shelves in a niche in the wall, and a few small or medium sized cooking-pots²⁵ on a shelf usually above the stove or fireplace. Again, the only large ceramic vessel(s) in the kitchen was the kneading basin(s), used for the kneading of the family bread as well as the dough for pies and cakes, the mixing of *pitta* and sausage fillings, the soaking of beans and chickpeas, the cleansing of lentils and split peas from impurities and, occasionally, for other domestic uses.

But there was one exception. Somewhere in the house (more often than not somewhere outdoors) there was lying upside-down one large cooking vessel for that special day of celebration: a name-day, Easter Sunday, a family wedding (Figs. 23.1a–b).

So rare and unusual was its purpose, that even its name never even remotely resembled “*tsoukali*”, the generic term for cooking pot. It came under the names of *mastelo*,²⁶ *testo*²⁷ or *tavas*²⁸ in the Cyclades, *glastra*²⁹ in Andros and Astypalaia, *rifiko* or *rifolekani*³⁰ or *alisiferi*³¹ or *lambrolakani*³² in Rhodes, *lakani*³³ in Kos and Kastellorizo, *lakanida* in Patmos, Leipsoi, Schoinoussa and Irakleia, *mou(v)ouri*³⁴ in Kalymnos, *diouri* in Nissyros, *pilinos*³⁵ in Halki or *tsoumbleki*³⁶ in Thessaly.³⁷ Across the Aegean, this large cooking pot in the form of either a large deep basin or a tub or a large flower-pot had one single use: cooking lamb in the oven for an extraordinary festivity. Depending on the local recipe, it came with or without a lid; it was usually unglazed, but always had two handles, vertical or horizontal, like most cooking pots.

3. Fireplace, oven and stove: dictating the shape of the cooking pot base

Large built ovens, usually by the main door to the house on either side, indoors or outdoors, would burn once-a-week, mostly on a Saturday, for the family’s weekly bread (usually seven loaves or more, each of at least 2 *okkas*,³⁸ baked, depending on the dimensions of the oven, together or in a row). Housewives used the opportunity and baked a *pitta* or cooked a stew in the oven after bread³⁹. Otherwise, these large ovens would be used only exceptionally, for cooking on a Sunday or on an important day. The process was time consuming and, in a sense, expensive, since it implied a large quantity of wood or brushwood, the former being scarce and both being difficult to carry. Smaller alternatives were thus preferred for daily use, most common of which

are the *gastra*,⁴⁰ the *parestia* or *parastia* (the kitchen fire-place)⁴¹ and the charcoal brazier (*foufou* or *fovou*) (Fig. 23.2a), all less expensive to use. A specific version of the *gastra*, called *bondza*⁴² in Thessaly, Macedonia and Thrace, was portable (Fig. 23.2b); and so were the braziers, usually found on the islands. This made them easier to use and to clean and – taking into account the warm climatic conditions for most of the year – they had the advantage of an alternative use outdoors, thus not heating any further the already hot kitchen.

Cooking-pots were made for each case and to each measure. As a rule, vessels that would be used directly on a live fire (fireplace, brazier, stove) had a curved base, being more resistant to high temperature,⁴³ while vessels that would be used in an oven chamber, where any fire would have been swept to the sides, or in a *gastra*, where there was no fire at all, could afford to be flat.⁴⁴ This rule faded with time, especially in areas where the mixture of clay and the throwing techniques increased conductivity. At any rate, the flat base was considered more practical in all cases but the brazier, and so in most areas where braziers were not in use (most of the mainland) potters switched, over the years, to the flat base. Eventually, during the course of the 19th and 20th centuries, many households preferred to take the Sunday dish to the neighbourhood bakery to cook at a small price and immense convenience. Bakeries would also encourage the use of flat pots, so that any unwanted leaning of the dish would not cause any trouble. By the 1950s only a few island potters continued to produce cooking pots with a curved base.

Of course part of the cooking, especially the baking of *pittes* and savoury breads, was not made in a cooking pot at all, but instead directly in the *gastra* or *bondza* or on a hot-plate, either a purpose-made one (Fig. 23.2c), known under the names *plaka* or *kalitsounoplaka*⁴⁵ (Crete), *pittoplaka*, *gastroplaka* and *sadzik*⁴⁶ (Cyprus) or using instead the flat lid of a large *pithos*, like the *pouma keramopitta*⁴⁷ (Imvros) or *tapakis*⁴⁸ (Rhodes). A perforated variation is the *roupa* in Leros.

4. Recipe and form

Attempting a typology of Aegean cooking pots, one can distinguish between eight main forms (types A to H) and a few variations:

A. Round pot with tall walls and two horizontal or vertical loop handles on the rim or shoulder, red-slipped and glazed inside (Figs. 23.3a–b)

This *tsoukali* par excellence was found across the Aegean and beyond⁴⁹ and was used for every recipe that needed

boiling or frying, from meat or vegetable casseroles to soups, from boiling wheat for *kollyva* or rice or pasta to the making of fruit preserves, from frying dry cod in batter or the semolina for *halva* to the cooking of the lamb intestines for the *mageiritsa*. Often it was used to simply boil milk or eggs or to heat water for washing up or for the bath. A contemporary equivalent would be an all-purpose pan (combining saucepan and frying pan), although this form could also be used in the oven. Rarely lidded, this was not an appropriate vessel for recipes that needed slow and long cooking.

Common variant: whitened outside (rough white slip)

Common variant: higher walls and four vertical loop handles on the rim (Figs. 23.8a–b below), possibly imitating French marmites from Vallauris after 1880.⁵⁰

Rare variant: domed inset lid

Older variant: pumpkin-shaped body with tall neck (Fig. 23.6c, below).

B. Round dish with low vertical walls and two horizontal handles, glazed inside (Fig. 23.3c)

The oven dish of nowadays would make a close equivalent. Good for *pitta*, syrupy cakes, biscuits, meat-and-pasta stews, meat or fish in oil and herb sauces, oven omelettes, *melopittes* (egg-cheese-and-honey cakes), etc. Found across the Aegean. More recently referred to as *giouvetsi*,⁵¹ especially among potters and users in Attica, mainland Greece and the islands of North Aegean after the exchange of populations with Turkey in 1924. Older names that survived include *padela*,⁵² *plakero tsoukali*, *katsarola*⁵³ (Cyclades), *harani*⁵⁴ (Imvros), *oualá*⁵⁵ (Neveska/Nymphaio) or just *tsikali* (Crete and elsewhere) or its corrupt form *skali* (Andros).

Common variant: whitened outside.

C. Bowl-shaped pot without handles, glazed inside and sometimes whitened outside (Fig. 23.3d)

To be found in the Cyclades, Lesbos, the Peloponnese and Tyrnavos (Thessaly). In Samos it is appropriately called *tsoukalogavatha* (literally tsoukali-bowl). Good for recipes that need to be executed in the oven, but for which type B was too shallow, namely saucy oven stews.

A somewhat rare and perhaps unique variant is the bowl-shaped vessel with curved body made in Siphnos (Fig. 23.3e).

D. Round pot with tall walls and a long tubular handle, with or without a domed inset lid, glazed inside and sometimes whitened outside (Fig. 23.4a)

Smaller in size than type A, an equivalent to a medium-small saucepan for boiling milk and cooking very small

portions of gruel soups and meat sauces. Commonly known under the names of *testo* (Lesbos), *tentzeroudi* and *tsiardoudo* (Thrace), *katsarola* (Thessaly and elsewhere) or simply *tsoukali* (Samos, Thrace, Crete).

E.1. Bell-shaped pot with a flat or domed inset lid and no glazing. Usually no red slip inside (Fig. 23.4b)

For sole use in the oven, this lidded *tsoukali* is made for recipes requiring long cooking. The lid obstructs evaporation (for better application it is often sealed with a coil of dough around the rim) making this vessel ideal for chickpeas (the cheaper alternative to Sunday meat across the islands) and lamb stews. This form is commonly called *tsoukali*, but local terms have also been coined to differentiate it. Commonest among them is the name *skepastaria*, literally “the lidded one” (Siphnos and the Cyclades), *skountavlos* and *koupaournou*⁵⁶ (Cyclades), *manatsouki*⁵⁷ (Rhodes), *pitiakos* (Dodecanese), *favoudotsoukalo*⁵⁸ (Samos) and *katsarola* (Thassos).

Common variant: whitened outside

A Cyprus variant has a dual use as cooking pot (*ttavas* or *kourellin*⁵⁹) and fresh cheese container (*haloumoukouza*), hence its dropped inset lid, serving to press haloumi cheese into the brine (Fig. 23.9b, below). I suspect that the *pitiakos* in the Dodecanese served a similar dual need.⁶⁰

E.2. Shorter bell-shaped pot with wide neck and domed inset lid, unglazed and with no red slip on the inside (Fig. 23.4c)

Found solely in Thessaly under the name *tsoukala* (large *tsoukali*) for the preparation of tripe, the Christmas Eve dish across Thessaly. Made exclusively in Tyrnavos, the *tsoukala* might have been a cheaper version of a copper original. Indeed it was so cheap to purchase, that it is said that housewives discarded it after a single use and replaced it every Christmas.⁶¹

Recent variant: glazed inside-out.

F. Pitcher-shaped pot with a vertical handle and no glazing (Figs. 23.5a–b)

Small fire-proof jug for boiling milk, borrowing its name from different diminutives of *tsoukali*, like *tsoukaleli* or *tsoukaloudeli* (Lesbos).

A somewhat larger oven-proof version (containing up to 1.5 litres of liquid) is used for boiling split peas that would eventually be turned into *fava*, the split pea pudding (Fig. 23.5b, left). Unique to Thessaly (*tsoukali*), the nearby islands of the Sporades and Skyros (*favotsoukalo* and for the larger version *Yorgaros*)⁶² and Lesbos (*gragoudha*).



a



b



c

Figure 23.4. a) Type D *testo* from Filia, Lesbos, third quarter of the 20th century; b) Type E1, lidded *skepastaria* for the *revythada* (Sunday chickpea soup) from Cheronissos, Sifnos, c. 1980; c) Type E2, lidded *tsoukala* for the Christmas tripe. From Tyrnavos, c. 1980.

G. Flower-pot-shaped or tub-shaped or basin-shaped pot with two handles and no glazing; no red slip inside (Figs. 23.1a–b, above)

The large vessel for special occasions, already described in section 2 above.

H. Deep-bowl or barrel-shaped pot with two ears or small handles on the rim and no glazing or red slip inside (Figs. 23.5c–d)

Particular to Cyprus, under the names of *tsoukka*, *tsoukalla*,

tsoukallin and *Mageirissa*,⁶³ this all-purpose *tsoukali* is similar to a pot made in Asia Minor (Sardis) and a vessel used in Crete for the roasting of chickpeas on a bed of hot sea-sand (*ammotsikalo*).⁶⁴

Finally, two unica, possibly 20th century additions imitating metal prototypes, should be included here: (a) small frying-pans (Fig. 23.6a) with a long tubular handle, glazed inside and whitened outside, made in Siphnos and Maroussi for the restaurant market and (b) small *briki*, possibly a unicum of Lesbos (more recently made also in Tyrnavos), for the preparation of coffee and herbal teas (Fig. 23.6b).



a



b



c



d

Figure 23.5. a) Type F *tsikaleli* from Aspropotamos Mantamadou, Lesbos, prior to 1960; b) Type F *favotsoukalo* in two sizes from Skyros, c. 1970; c) Type H miniature replica of a *mageirissa* or *tsoukka* from Foini, Cyprus, c. 2000; d) Type H *ammotsikalo* from Margarites, Crete, third quarter of the 20th century.

5. From *zucca* to *tsoukali*: nomenclature and pedigree

When the learned monk Agapios, back in 1641, described the Cretan village of Thrapsano as a village of *tzoukalades*⁶⁵ (literally *tsoukali*-makers), he knew only too well, as a Cretan himself, that the main production of Thrapsano was not in cooking pots, but also in large storage jars (*pithoi*), water jugs, pots and presumably cooking pots too.⁶⁶ *Tzoukalas* meant then, as *tsoukalas* or *tsikalas* does now, “potter”. The other generic name for potter, *aggeioplastis*, is a modern classicizing re-invention. So is *keramopoios*, the tile- and roof-tile maker, although this has been for centuries a

different profession, requiring different – and thought inferior – skills and different infrastructure. A *keramas* or *keramidas*, the medieval and modern name, was always a mere artisan, *tsoukalas* was a *mastoras*, a skilled master. Deriving from the word “*tsoukalas*”, numerous locations around the Aegean, usually near prosperous villages and towns, are called *Tsoukalas*, *Tsoukalades*, *Tsoukaleika*, but also *Tsikalarío* (meaning “pottery workshop”), *Tsikalaria* (a group of workshops) and so on.⁶⁷ Evidently, the word “*tsoukali*” had long ago become synonymous to “ceramic”, much in the same way as “pot” has lent its name to “pottery” in English. And “*tsoukalarío*” became synonymous to “pottery workshop” as in the French “*atelier de poterie*” from the

word “pot” or the German “Töpferwerkstatt” from the word “Topf” respectively.

It is not known when the words *tzoukali* or *tsoukali* or *tsikali* and, subsequently, *tsoukalas* were introduced in the Greek language. In antiquity and in Septuagint Greek the name *κεραμεύς* meant both “potter” and “tile-maker” (at the time a single profession), and the term remains alive in the various comments of the Atticizing Byzantine scholars. According to Bakirtzis (1989), “*tsoukali*” must have entered the Greek language as “*tzykalion*” in or before the 12th century⁶⁸ and according to Koraes⁶⁹ and others it should be associated to the Venetian word “*zucca*” (“pumpkin”), presumably lending the name to the fire-proof vessel of similar shape, a specific globular cooking pot, with a tall neck under the rim. Attesting to this theory is an interesting pumpkin-shaped example from the bottom of the sea near Platys Yalos, now in the Folk Museum of Apollonia, Siphnos, dated by the local collector – arbitrarily and perhaps erroneously – to the 1930s (Fig. 23.6c).

No matter how inconclusive the etymology, it is interesting to note, that “*zucca*” survives as “*tsoukka*” in Cyprus, “*tsouka*” in Rhodes and as “*tsuka*” in the Grecanico idiom of Calabria and Puglia in South Italy (whether as a medieval remnant or as a more recent re-introduction by Greek and/or Albanian immigrants being still unknown).

Furthermore, it is not known whether “*tsoukali*” (as a diminutive of “*tsouka*”) denotes exclusively a ceramic fire-proof vessel or includes contemporary, more expensive metal pots of the same use. It seems that use, rather than raw material, dictated the name. Cooking-vessels made of copper, like *kakkavi(tsa)*, *harani*, *tapsi* or *tepsi*, *katsarola*, *tetzeres* etc. all have their namesake vessels made of clay, despite the occasional differences in size or detail. By analogy, “*tsoukali*” may have started as a pumpkin-shaped metal pot, but the name came to denote clay ones as well, or vice-versa. By further analogy, the name eventually came to be applied to all cooking pots, irrespective of form, becoming the generic name of this category and eventually of all pottery.

To complicate things further, it is noteworthy, that once “*tsoukali*” came to denote the entire genre of “pottery” (as in the name *tsoukalas* for “potter”), several ceramics of a completely different function borrowed the specific name *tsoukali*, either as a composite part of their own name, as in “*giaourtotsoukalo*” (yoghurt-pot) and “*kapnotsoukalo*” (bee-repellent smoke-pot in Samos), or directly as their own discriminator, as in the uses of *tsoukali* for “ewer” (Cyclades), “mug” (Skyros) and even “night-pot” (Imvros).

It is therefore quite clear, that the nomenclature of modern Aegean cooking pots can be only of limited value to their question of pedigree. At best, one can perhaps

assume – albeit arbitrarily – that the pumpkin form was a western introduction of the Middle Ages. Or perhaps that one or other specific name denotes a relation with another area or another ethnic group or a new need that was to be met. Otherwise, in a region where clay cooking pots have been continually produced ever since the Early Neolithic, it seems difficult to make any valid assumption about the pedigree of modern pots, without field and laboratory evidence. Seemingly, most forms are timeless and it perhaps ought to be accepted, that once a practical need had been successfully met in no-matter-how-distant a past, workshops were reluctant to adopt major differentiations.⁷⁰

It is true, that this rather static view of the matter, where pedigree is – for good reasons – deliberately underplayed and evolution is *a priori* taken for slow and given a secondary importance, may raise more questions than it provides answers. Was the production system of every pottery centre in the Aegean equally introspective and isolationist, so as to exclude any external influence that would bring about change? Is adaptability to change being mistaken for continuity? To what extent was the contemporary technology – and skilful knowledge – of each age available locally? Were the raw materials, namely clay of certain specifications, within reach of the local potter? And finally, did trading (of both raw materials and ready-made pots) and potter migrations successfully bridge these gaps?

The answer is a composite one. Change requires movement of ideas or materials or goods or skill or labour or more than one of them or all. And in the greater Aegean region, free movement certainly knew restrictions, for different reasons and at different times. For one, the mainland on both sides had a ruined road system, obliging traders to use the sea-routes instead. Then, the sea-routes suffered from piracy to such an extent, that terrorised inhabitants of mainland coasts and islands were at times forced to move entire main villages inland.⁷¹ Typically enough, there is no record or material evidence of a single pottery workshop on the coast anywhere south of the Dardanelles before 1840,⁷² piracy having been controlled and gradually eliminated in that decade.⁷³ Then, Crete was under the Venetians until 1669, while several Cycladic islands and a few towns in the South Peloponnese remained under catholic domination until much (and some most) of the Ottoman era in the Aegean. And, for different political and/or economic reasons (such as port duties) in each case, commerce and free movement between the different sovereign entities was not encouraged.

Practically, change was allowed to happen only after 1840. And it was the Siphnians who took best advantage of it.

6. Humble or invaluable? Ceramic technology and value: the case of Siphnos

*Ce plomb, qui est comme une ceruse naturelle, se vitrifie facilement, et c'est ce qui rend excellentes les marmites de l'île [de Siphnos].*⁷⁴

Joseph Pitton de Tournefort, (1717)

Stanley Casson in his pioneering article “The Modern Pottery Trade in the Aegean” (1938) pointed out that bulky and weighty pottery was practically impossible to export by sea, due to the high freightage charges that contrasted heavily with the low prices paid for pots by the end customer. Casson argued that smaller boats were cheaper and therefore preferred, but it should be noted that, unless pots had some sort of added value, even caique and barque freightage was unreasonably affecting the price; therefore it would not have been done, even in 1938, unless there was no local alternative. Excellent pottery products, like the very large and very enduring Cretan *pithoi* never found their way out of the island. Freightage for such large and heavy jars would simply be an unaffordable burden. And yet, Messenian *pithoi* (“*tzares*”) from the area of Koroni, equally large and often heavier, were traded from Cadiz to Palestine and from the Black Sea to Libya. Similarly, *pithoi* (“*sfides*”) made in Ainos (modern day Enez) were shipped from the estuary of Evros in Thrace to Constantinople/Istanbul and the entire North Aegean, while, loaded on river barques, they would reach Adrianople (Edirne) and Didymoteicho inland.⁷⁵ The reason was that, unlike their Cretan cousins, *pithoi* from Koroni and Ainos were less porous and therefore superior in their oil-proof quality. Humble as they might have been, they were considered invaluable to any oil-producing family (or community or monastery) and they were sought after almost regardless of price.⁷⁶

Two very competitive products were being produced on the island of Siphnos: excellent water jugs and glazed cooking-pots.⁷⁷ The latter were produced since at least the 17th century (a reference of Tournefort “some fifty years before” 1700 gives a *terminus ante quem*) and probably much earlier, since Siphnos, unlike a few other Aegean islands, was continuously occupied throughout times of turmoil and change. And unglazed jugs may well have been produced since earlier, once it is believed that their technology was simpler and widely available since antiquity.

Siphnian jugs were thin-walled, therefore light enough for a woman or a child to carry, often more than once, on a daily itinerary from a source of water to home. And despite their lightness, they were very enduring, thanks to the clay mixture and the mastery of the potters in firing. And yet, shipping them to even the nearest islands was economically impossible, had there been a possibility

of local production as an alternative. So the Siphnians migrated en masse, especially after 1840, seasonally or permanently, to almost every single island in the Aegean, including Crete, and to every coast on either side of that sea.⁷⁸ The water shortage in metropolitan Athens at the same period brought dozens of Siphnian potters to the capital to make water jugs for the horse-carts distributing drinking water to the inhabitants.⁷⁹ By the middle of the 19th century, “*Siphnios*” became synonymous to “*Tsoukalas*”, while beaches that once had Siphnian potter settlements are still referred to as “*Sifneikos Yalos*” (Siphnian beach) across the Aegean.

Siphnians made several efforts to produce also cooking pots in their newly-founded colonies, with mixed results. They themselves created the legend, that their own local clay was superior in its fire-resisting qualities. In reality, Siphnian clay was as good as any in the Aegean (Giannopoulou 2001). *Kalagathas* (a non-plastic yellow clay, low in argyle and high in quartz) and *psahnoto* (or *psofio* or *psahnohoma*, a red sandy clay, rich in argyle and mica and poor in lime) were mixed by one part to two to produce a clay ideal for firing in low temperatures (roughly 800° C in the first firing and 950° C in the second, *i.e.* after a glazing paste was applied). In some cases, a third clay was added to the mixture, *asproula* or *asproula me psahni*,⁸⁰ to increase the number of pores during firing, thus ensuring even better conductivity. *Kalagathas* was soaked in water in lumps, while *psahnoto* was first powdered with the help of a wooden mallet and then sieved before being soaked in large mud-basins, the *karoutes*.⁸¹ Particles that surfaced were extracted to be used as white and red slip respectively, while the rest was left to half-dry before it was taken indoors to knead. This technology came from years of experimenting with the idiosyncrasies of local clay, like anywhere else in the Aegean and the world. Indeed, the Siphnians themselves would use different recipes when working in different lands. So the superiority of local clay may be no less than a myth. Besides, the fact that during at least the last century, Siphnian potters had quarried and/or imported clay quantities from outside Siphnos, namely from far-away Koroni (where surface beds of excellent quality yellow clay are conveniently situated on the coast), or from Aegina,⁸² but also from nearby Milos (white kaolin for whitening), leaves open the possibility that clay imports might have been more or less common practice in the past. But such information has not come down to us. What is true, is that the Siphnians were masters in mixing – but so were skilful potters elsewhere in the Aegean – and masters at throwing, drying⁸³ and firing. Every potter and his apprentices would have shared one or two secrets, but then again the mobility of pottery workers from one workshop to the other would have made it a matter of at most one generation before these secrets were spread



a



b



c

Figure 23.6. a) Small frying pans imitating metal prototypes, from Maroussi or Siphnos, c. 1970; b) *briki* from Aghios Stephanos Mantamadou, Lesbos, c. 1980; c) pumpkin shaped cooking pot from the sea bed near Platys Yalos. Unknown dating. Folk Museum of Apollonia, Siphnos. Photographs Y. Kyriakopoulos.



a



b

Figure 23.7. a) Fragment from a Type A *tsikali* with the stamp of Zervos Workshop in Kamares, Siphnos, c. 1950 or earlier; b) detail of a type A *tsikali* with the stamp of Frantzeskos Workshop in Kamares, Siphnos, third quarter of the 20th century.



Figure 23.8. Siphnian cooking pots (Type A, four-handle variant) being loaded onto boats heading for the caique in the background. Vathy, Workshop of Yannis Atsonios, c. 1950–1955. Courtesy of the Photographic Archive of Yorgis Loukis, Apollonia, Siphnos.



a



b

Figure 23.9. a) Glazed *skepastaria* for use as a storage vessel. From Platys Yalos, Siphnos, c. 1970; b) Type E1, Cyprus variant, in dual use as cooking pot (*ttavas* or *kourellin*) and as storage vessel for haloumi cheese in brine (*haloumoukouza*), from Kornos, Cyprus, c. 2000.

and turned into common practice. Would all these suffice for Siphnian pots to become best-sellers and gradually influence or – in some cases completely – replace other functionally perfect pots of the Aegean, such as those of Lesbos, Crete or Tyrnavos, to mention only a few?

In order to understand this phenomenon, the history of Siphnian cooking pots must be broken down into three distinct periods:

- (i) The Early Period (prior to 1840), when Siphnian potteries were situated inland and were serving the

local market and a few other islands (perhaps the nearby ones) only. Some Siphnian potters' colonies existed before 1810 and it is well documented that the proceeds of Siphnian pottery sold outside the island were by then already thirty times larger than what was sold on Siphnos itself,⁸⁴ but the extent and geographical spread of such settlements cannot – for the time being – be estimated with any accuracy. Nor can it be specified, whether cooking pots were produced in those settlements at all.

- (ii) The Jug-Booming Period (from 1840 to 1930), when Siphnian potters moved their workshops to the coasts, started exporting extensively and, gradually, emigrated to the four corners of the Aegean and beyond. Potter colonists, at first only jug makers, invited fellow-islander pot-makers to the colonies or mediated in the trade of Siphnos-made pots in their new homes. This is the period when the myth of the supposed superiority of Siphnian pots was created, presumably on marketing grounds serving the interests of the localised Siphnian caste.
- (iii) The Industry Period (from c. 1900 to 1948). What now really distinguishes Siphnian cooking pots, above all, is their cost and their marketing. The introduction of a French-inspired two-storey rectangular kiln, sometime before or after the turn of the 20th century,⁸⁵ allowed a huge economy in production.⁸⁶ The capacity of these kilns meant that much larger numbers would be fired in one go.⁸⁷ And the availability of one chamber in each floor, to accommodate simultaneously the first firing (upper level with lower temperature) and the second firing (lower level for higher temperature for glazing), meant that huge savings in fuel, time and effort were achieved.⁸⁸ With cost almost halved, the Siphnians were able to produce multiple quantities in a fraction of the time needed by the other workshops in the Aegean for the same result. Small family work-sheds developed into large workshops,⁸⁹ the number of which is recorded to have exceeded ninety by the 1920s, extraordinary for a population of c. 4000. Practically, over 15% of the population depended directly on pottery for a living, the number being multiplied for the island economy as a whole. The Siphnians added to their success by literally branding their product. *Asprisma* (whitening), a kaolin-based slip on the outside, gave a markedly different look and texture. And the workshop stamp, pressed on the damp clay before firing, authenticated the product and protected it against imitations (Figs. 23.7 and 23.3e).

So, Siphnos-made cooking-pots were exported on caiques (Figs. 23.8a–b) throughout the Aegean for over 110 years (and extensively so for just over 50 years). Their superior quality – real and perceived – and, eventually, their low production cost were such, that freightage⁹⁰ was not a problem. The main problem with the Siphnos pot “industry” (especially after 1930) was the duties paid in ports and the high profit margins of city wholesalers. When the latter reached over 73% on the retail price in 1948, trade itself killed that industry even before the appearance of aluminium.

7. Form and use: an axiom to remember

In section 5 of this chapter, the association of name and form has been discussed and it has been argued, hopefully convincingly, that a single name does not necessarily describe either a single function or form (e.g. *tsikali* for ewer, smoke-pot or night-pot). Likewise, a single use, e.g. cooking lamb in the oven, does not necessarily make the vessel involved a *tsoukali*. But it is not only nomenclature that may give cause for misinterpretation. Form and use ought not to be automatically associated either. And this axiom is universally valid: form does not dictate the use, neither in the modern Aegean nor in any other period or place. Regarding the Aegean, there are four main reasons for such disjunction and variability:

- (i) Scarcity of vessels in the household. A *tsoukali* could very well be used as a serving dish, or a mixing bowl, or a vessel to store minor items in (like buttons, needles or cutlery). The lidded *skepastaria* (Fig. 23.4b, above) is often used as a heating vessel (filled with charcoal like otherwise a *mangali*) or as a pot to store the remains of the fire before leaving the house. And even the Easter pot was possibly used as a laundry basin or a soap-making basin.
- (ii) Coincidental use. Impermeable glazed *tsoukalia* were found convenient for the making of yoghurt, which – with the main exception of Lesbos – is made exclusively in pots identical to *tsoukalia*, but without handles.
- (iii) Potters’ repertoire and master skills. A form that is aesthetically pleasing and functionally sufficient can very well be reproduced for different uses with minor or no adaptations at all. Glazed Siphnian *skepastaries* (Fig. 23.9a) would be sold for storage jars, exactly like the Cypriot lidded cooking pot (Fig. 23.9b), which was being sold as a jar for keeping fresh cheese in brine.
- (iv) Secondary use. Although chimney-pots are the best example for broken pots in secondary use in the Aegean, a reject or damaged cooking pot could as well serve in instances like the feeding of the animals or in the storage of minor items or as an accessory for the potter himself (usually containing a sponge next to the wheel-table).

The fact that pots in the above examples are oven-proof or fire-proof may or may not be relevant.

8. Cooking pots after 1950: an epilogue

Nostalgia and the tourist market kept a small production of earthen cooking pots alive until the late 1970s. Larger

in size or individually portioned for cheese recipes in the oven or for yoghurt, Type B vessels (Fig. 23.3c, above) are still being made, but not in traditional workshops. Of the five potters remaining in Greece who still use local clay and still throw and fire pots in the old way, none is any longer producing glazed cooking pots, while only one, now thinking of retiring, is still making the *skepastaria* in Cheronissos, Siphnos.

Sadly, after 65 centuries, the craft can be pronounced dead.

Acknowledgements

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Notes

- 1 Much of the information used in this paper comes from numerous interviews with potters and elderly people around the Aegean, given to the author between 1976 and the present day. In the absence of a comprehensive scientific bibliography on the subject of food and dietary customs and the way these are related to specific vessels, the book of G. Makryonitis (2005) as well as the extraordinary lifetime work of the late Betty Psaropoulou (1982; 1990; 2005) and her indefatigable team at the Centre for the Study of Modern Pottery in Athens (Kentro Meletis Neoteris Kerameikis) constitute the most important published overviews. Further references are listed in the bibliography. Unless otherwise stated, all items illustrated are from the author's private collection.
- 2 In Joseph Pitton de Tournefort's account of his travels through the Levant in 1700–1702 (Tournefort 1717; see Yerasimos 1982).
- 3 For the modern Greek food repertoire, Dalby's *Siren Feasts* (Dalby 1996, 178–209) offers a brief survey in English of the paths of its development since antiquity and how it diversified by absorbing neighbouring traditions. In the absence of an overview of the development of Greek food since the Middle Ages, Koukoules 1952 remains an indispensable source in Greek.
- 4 A close translation for "*prosfai*" would be "garnish". The medieval "*prosfagion*" included fish, meat, cheese and beans. But in the course of centuries, particularly in areas of the South Aegean and Cyprus, corrupt forms of the word, like *prosfas* (Rhodes), *brosfai* (Crete) and *syfai* (Nissyros) came to mean solely cheese (Koukoules 1952).
- 5 Meat and fresh fish were usually grilled or fried, while casserole recipes, usually with bulgur or quince (and, after 1830, potatoes) or almonds or vegetables were less frequent, for they required more time and attention from the women of the house.
- 6 A variety of home-made pastas included *matses* (or *matsi* or *matsetta*), *gogges* and *hylopittes* while *trahana* and *xinohondros* (cracked wheat or flour with fermented milk or yoghurt), *bligouri* (bulgur) and *hondros* (plain cracked wheat) were also cooked in boiling water.
- 7 Tomatoes were introduced in the Aegean in around 1800 via Italy and Corfu. It seems that the first recipe mentioned is a Pugliot – Jewish recipe for *strapatsada* (scrambled eggs with tomatoes) from Corfu in the 1790s.
- 8 An extraordinary variety of wild greens, from nettles to wild chicory were picked regularly in the wild and were either dried for future use or boiled fresh as a salad or cooked with meat or fish or beans or rice in respective casserole dishes.
- 9 *Pitta* (literally "pie") is usually a large pie or cake cut into individual portions. *Pitta* may be sweet or salted, usually baked in the oven and more often than not consisting of *fyllo* (pastry-sheets) containing a filling.
- 10 Usually thrushes, partridges, woodcocks, pheasants, hares, wild rabbits, smoked quails – particularly in the Mani – and sometimes also exotic peacocks kept in the garden or pigeon (domesticated or wild).
- 11 Semolina pudding made with olive-oil (or butter) and honey (or sugar).
- 12 Boiled wheat, sugar and pomegranate, a recipe for the passage to death, whose ingredients can be traced as far back as the Homeric Hymn to Demeter.
- 13 Literally "wedding pilau", a meat and rice pilaf cooked in the stock of goat and rooster.
- 14 There were marked differences between Christian, Muslim and Jewish cuisines regarding specific holidays and permissible ingredients. Everyday food was otherwise remarkably similar. Compare for example the striking similarity of Romaniot Jewish recipes to the Christian ones in Stavroulakis 1986.
- 15 Palatial food habits in Constantinople are a tradition of its own and are not treated here. The culinary habits as well as the dining habits of a cast of Porte officials and pashas in major cities across the empire (see Gerasimou 2004) are equally not included. Besides access to more expensive and rare ingredients, like musk and mastic, it is highly likely that these large kitchens would use exclusively metal pots for the preparation of food.
- 16 It is interesting that in the Bavarian-inspired town-planning of modern Sparta, as late as 1834, planners imposed a Hippodamian canvas, but allowed for the larger part of the surface of each rectangular plot to be used as a back-yard "*baksas*" for the household needs in fruit and vegetables. This certainly reflects the living conditions of the inhabitants of the nearby townships and villages (mainly Mystras), who were intended to be invited to inhabit the new town.
- 17 The consumption pattern of olive-oil *versus* butter seems to also have had a religious bias in the case of Jews (who would rarely use butter and certainly never together with meat) and an ethnic bias with Muslims of Turkish origin who would use olive-oil predominantly for pharmaceutical and cosmetic purposes until the 18th century (Gerasimou 2004).
- 18 My late friend Sophia Drantakis from Volos described to me her own experience of the poorer villagers of the Thessalian plain when, as late as the German Occupation of 1941–44, they were surprised to see an artichoke for the first time in their lives. In her own not-so-exaggerating words, those relatives in the plain would have "*trahana* for breakfast, *trahana* for lunch and *trahana* for dinner".
- 19 Fish was exclusive to the diet of coastal areas and the islands. However, dry cod, "*bakaliaros*", imported from the North Atlantic since 1700, was a basic ingredient of Aegean cuisine, even in remote townships further inland. Also, river fish, like trout and eels made popular casseroles with greens and garlic sauce (*skordhalia*) everywhere inland; and so did lake fish in the North.
- 20 Low, round Ottoman table (originally just a skin or a carpet,

- similar to the Byzantine *hamokkouvma* in military expeditions); diners sat on the ground or on low stools around it. The “*sofra*” is associated with the tribal past of the Ottomans and Arabs (deriving from the word *sefer* = travel), but it was largely adopted in the Aegean as the sole dining-table of the house and would only be replaced gradually from the 18th through to the 20th centuries as a result of the westernisation of dining habits.
- 21 Interestingly, bread itself was used in *prosfai* recipes, usually in the form of stale breadcrumbs mixed with milk or oil or vinegar or garlic or sugar or more of them together. Most characteristic are easy-to-make sauces, like *skordhalia* (garlic sauce, across the Aegean) and *papara* (mixing the ploughmen’s refreshing garlic drink, *skordhari*, with breadcrumbs, a recipe of Thessaly and the North).
 - 22 A fact that owes to the Ottoman habit of sharing instead of individual serving. Dishes were often less numerous than the individuals inhabiting the house; see Vroom 2003.
 - 23 In some cases, especially in the Cyclades, scarcity of space and the difficulty of digging a basement in the rock dictated that ground-floor kitchen and storage room were one and the same.
 - 24 Pasta and *trahana* were not stored in jars, but in linen bags to allow “breathing”.
 - 25 Wealthier households, inns, monasteries and welfare institutions for the sick, the disabled, the orphans and the poor, although they too fitted this general rule of plain and austere, should, nevertheless, remain out of the scope of this paper, for they could afford copper cooking wares, larger in size and more practical to use.
 - 26 Venetian for “wooden tub”. The time of introduction of “*mastello*” as “*mastelo*” in Greek is unknown, but presumably succeeds the fourth Crusade (1204).
 - 27 Possibly associated to the Venetian word *técia*, “pan”. On Lesbos the term “*testo*” is still in use today to describe the local lidded pan with long handle; on Siphnos it designates an oven-dish.
 - 28 From Turkish *tava*, “pan”.
 - 29 Literally “flower-pot”.
 - 30 Deriving from ancient Greek *erifion*, “baby lamb” and *lekani*, “basin”.
 - 31 From its alternative use as an *alisiva* container, i.e. a laundry basin or a soap-making basin. *Alisiva* = lye, an alkaline substance leached from wood ashes < Ital. *liscivia* < lat. *Lixivia*.
 - 32 From *lekani* and *Lambri*, a synonym for Easter.
 - 33 Corruption of *lekani*.
 - 34 Corruption of *aimovoro*, “blood-thirsty”.
 - 35 Literally “the clay one”.
 - 36 From Turkish *comlek*, “pot, casserole”.
 - 37 In most mainland areas of Central and South Greece, Easter lamb was grilled outdoors on a long spit. Likewise, the Thessalian *tsoumbleki* was used for lamb (often with prunes) for wedding feasts, but not for Easter.
 - 38 *Okka* is the ottoman measure of mass, equalling 1.29 kg.
 - 39 Together with bread, housewives would bake *paximadia* (barley rusk), while on the outer part of the oven, a last-minute-pitta-bread, the *profourni* or *profourna* or *brofourni* or *propyro* or *propitta* (see also Koukoules 1952) or *fouskoti* or *brostofourni* or *avouloti* or *koufti* (Makryonitis 2005) would be made in order to satisfy the impatient children who would smell the bread that was being baked in the oven. Similarly, in Thessaly they would make the *petasti*, a finger-pressed dough with added olives and/or cheese.
 - 40 A built-in-the-floor or detached ceramic oven, where food is cooked by the preheated lid. Etymologically deriving from ancient Greek, from the namesake part of the pot (*gaster* = “belly” = “body”).
 - 41 Usually a raised corner surface with a chimney.
 - 42 *Tserepa* (Cephalonia), *tserepna* and *pondza* (Epirus), *tandouri* (East Attica), *forinou* (Cyprus), *klivanon* (Rhodes), *pyromachi* (Rethymno).
 - 43 Vogiatzoglou-Sakellaropoulou 2009 and Giannopoulou 2001 believe that they allowed a better distribution of temperature, since the flame embraced the entire base.
 - 44 *Plakero* (literally “flat”) was the adjective commonly used to name these *tsoukalia*.
 - 45 *Plaka* still today designates the electric cooker hot-plate.
 - 46 From Turkish *saç*, a baking tray made in the Sardis region by women-potters as in Cyprus. But in Cyprus they are fired in kilns, while in the Sardis in the open air (Crane 1988; Ionas 2000).
 - 47 *Pouma* = *poma* = “lid”.
 - 48 *Tapa* = “lid”.
 - 49 Aegean-made *tsoukalia* were widely exported to Cyprus and the Levant as well as most of the Ionian islands and coast.
 - 50 A Siphnian Christmas carol of the 1930s, written down in the 1950s and published in 1991 (Troullos 1991) has given rise to a debate on the (mutual?) influences between Siphnos and the town of Vallauris, a 16th century centre of Ligurian potters (Petrucchi 1999) near Nice, in the South of France, that has continued to flourish ever since. However, this argument is largely speculative and based on hypotheses of surface finds in areas in or beyond the Aegean where Siphnian and (possibly) Vallauris pots co-existed. The argument may hold true from the third quarter of the 19th century onwards, but evidence is lacking for earlier periods.
 - 51 From Turkish *güvec* = “casserole”. After 1924 the term is almost universally used in Greek. Antonis Atsonios, a Siphnian of a long line of potters, claims that the term was imposed to Siphnos itself by the Piraeus-based traders. In some areas of Northern Greece, the term may have been in use even prior to 1924, as an Ottoman heritage. Likewise, in Romanian *ghiveci* means flower-pot and in Bulgarian *govec* means casserole.
 - 52 *Padella* = Italian for “frying pan”.
 - 53 *Katsarola*, in use in Vathy, Siphnos, only after WWII, a term imposed by the Piraeus traders (Atsonios).
 - 54 *Harani*, in use on the island of Imvros, comes from Turkish *hereni* = “pan”. The term originates in the namesake copper vessel, widely used across the Aegean.
 - 55 Vlach word from northwest Macedonia, resembling Romanian *oald*.
 - 56 *Koupaournou*, literally “oven-bowl”.
 - 57 *Manatsouki*, of unknown etymology, perhaps from *manari* (baby lamb) and *tsouka(li)*.
 - 58 *Favoudotsoukalo*, pot for the split-pea pudding.
 - 59 *Kourellin*, from *Kourellos*, a term used in other Greek-speaking areas to denote completely different vessels, usually pots for the transportation of milk.
 - 60 *Pitiakos*, or more correctly *pytiakos*, is a word that in all probability comes from *pytia* (= rennet) and beside its use as a cooking pot it was evidently also used in cheese-making (to coagulate milk solids into a curd by using rennet). E1 cooking-pots were also used in cheese-making in the Cyclades and elsewhere.
 - 61 The replacement story is validated by all four remaining Tyrnavos potters, the Kalyvas brothers, Christodoulou and Pnakas (separate interviews, May 2012).
 - 62 Literally “the big George”, possibly associated with a St George’s Day dish.
 - 63 *Magirissa*, literally “the cook”, is a generic name for all cooking pots in Cyprus and is not found elsewhere.
 - 64 Literally “sand-pot”.
 - 65 “Εἰς ἓνα χωρίον της Κρήτης, λεγόμενον Θραψανόν [...] πολυάνθρωπον, καὶ το περισσότερο εἶναι τζουκαλάδες” (“In

- a village in Crete, by the name of Thrapsano [...] with many inhabitants, the majority of whom are *tzoukalades*”), Agapios Landos 1641.
- 66 Tournefort, some 60 years later describes the production of Thrapsano as “*marmites de terre, pots et grosses cruches à huile*” (Tournefort 1717, cited after Yerasimos 1982).
- 67 Equally often, locations are known by the names *Keramidi*, *Keramidario etc.* (denoting “tile workshop”) or *Kamini*, *Kaminia etc.*, i.e. “Kiln(s)”, denoting either or both or, frequently, just lime kilns.
- 68 Found in lexicographers such as Zonaras. The earliest mention may be that of a fief of the Meghisti Lavra Monastery on Limnos, referred to as “*Tzoukalaria*” in 1304 (Bakirtzis 1989).
- 69 A. Koraes, *Atakta*, Vol I, 1828, cited in Bakirtzis 1989.
- 70 Breakthrough practical innovations, like vitreous glazing, which gradually spread from the 7th century AD onwards, had indeed played a role in detail adaptations (like the red slip on the inside to fill the pores and therefore allow a better application of the lead paste).
- 71 The island capitals, usually called *Chora*, were in most cases transferred inland in or around the 11th century. Current names of *Palaia Chora* or *Palaiochora* (“old town”) are to be found on several islands, Aegina and Kythira being among the better researched ones.
- 72 There is one possible exception of a nowadays deserted pottery workshop by the beach of Sidirounta in Chios. The building complex seems to have been purpose-built at a time far earlier than 1840, but we cannot be certain whether it had served as a pottery workshop uninterruptedly.
- 73 A rare dated example of potter migration from inland to the coast – denoting the end of the piracy threat – is the case of two Repanidi potters of Lemnos (then still on the Ottoman side of the Aegean), who migrated to the nearby Kotsinas beach in 1840 and 1848 respectively, inscribing the dates on the walls above the workshop doors (Psaropoulou 1982, 234).
- 74 “This lead, which is like natural pigment, vitrifies easily, and this is what makes the cooking pots of the island [of Siphnos] so excellent”. Tournefort 1717, cited after Yerasimos 1982.
- 75 A story verified by the elderly potters Dimitris Papavlassakoudis of Soufli (Thrace) and Nikos Tsoukalas of Afytos (Chalkidiki) in separate interviews in April 2001.
- 76 According to Dimitris Papavlassakoudis, an Ainite *pithos* would have cost ten times the value of one made at nearby Komotini (some exaggeration notwithstanding).
- 77 On the pottery production of Siphnos, see Giannopoulou 2001, Spathari-Begliti 1992, Troullos 1991, Vogiatzoglou-Sakellaropoulou 2009 and Wagner 1974.
- 78 Siphnian potters were known to have migrated also to the Ionian Sea (e.g. Kythira) or even to towns as far inland as Jannina in Epirus.
- 79 When the Marathon dam was completed in 1928, the demand for jugs fell abruptly and the Marousi Siphnians of Attica, as well as the islanders themselves, turned to exports to Egypt, Cyprus, the Dodecanese (then under Italian rule), Palestine, Malta, Turkey etc. Spathari-Begliti 1992 refers to a commercial agreement of 1934 between Greece and Turkey including, among others, pottery products.
- 80 In this case, the recipe was 70% red – 20% *kalagathas* – 10% *asproula*. For an expert account of the technologies of Siphnian pottery see Giannopoulou 2001.
- 81 Elsewhere also known as *limbes*.
- 82 Aegina clay was imported to Siphnos in the 1950s (a story told by Yannis Atsonios in the 1970s) to help potters experiment with new products, in this case with imitating the very successful Aegina *kanati* (ewer), which, thanks to its very high content in lime, was very porous and became famous for cooling water.
- 83 Siphnian potters would hit the base of the pot with a wooden paddle when it was still half-dry, in order to improve its conductivity during firing. Giannopoulou 2001 cites a parallel practice from South India. Elsewhere in the Aegean, rubbing or polishing the base was the common practice.
- 84 In 1810, the respective sums are 2,000 piastres versus 60,000 piastres (Wagner 1974).
- 85 Nikos Liaros, to whom I owe much of what I know about kilns in Greece is preparing a paper on this very issue.
- 86 Two storey kilns are to be found elsewhere in Greece, for example in Archangelos, Rhodes, but they are of a different layout and would not have been used for cooking pot production. Rectangular kilns, but with one chamber, are found on several islands, mostly in Siphnian colonies (Akrotiri in Lesbos, Thasos, Kythnos etc.) but also elsewhere (Mesagros in Aegina, Rhodes, Xanthi, Samos etc.). In the former, cooking pots are known to have been produced, thus making one suspect that they are newer than the original Siphnian ones. At any rate, Siphnians, both on Siphnos and abroad, continued to fire cooking pots in one-chamber kilns, both round and rectangular, for local needs.
- 87 Old round or rectangular kilns would take 60 pieces of various sizes, newer rectangular kilns would take 150 (Troullos 1991).
- 88 In the time an old kiln would produce 60 pieces in two firing steps, a new kiln would have produced 2 x 150. That is five times the output of an old round kiln.
- 89 Workshops would operate with a minimum of five, the *Mastoras* (responsible for the overall process, but skilled in throwing, drying, turning and adding handles), the *Basperetis* (meaning “low servant” – responsible for auxiliary duties, like transportation of pots in and out for drying, glazing, whitening, but also for firing), the *Kopelli tou Laspa* (meaning “the boy of the mud expert” – an aide for powdering, sieving, soaking and kneading clay), the *Chomatas* (meaning “the soil man” – the one quarrying and transporting the clay to the workshop) and the *Kladas* (meaning “the branches man” – collecting and bringing brushwood, usually on donkeys or mules). In larger workshops, several people would be employed in each post, except for the *Mastoras* who was one or, at most, two, usually brothers (for a detailed account of Siphnian workshop organisation see Troullos 1991).
- 90 Freightage for the trip from Siphnos to Piraeus was about 20 – 25% on the price ex-factory until 1947, when within a year, state-regulated price devaluation of the pots by 33% increased freightage to 35% (ATE Bank Records, 1948, quoted in Spathari-Begliti 1992). One can assume that pre-WWII freightage for a shorter distance, e.g. Siphnos to Antiparos or Folegandros would be in the region of 10% or less, while for a longer distance, e.g. to Thessaloniki or Alexandria or Limassol it should not have exceeded 30 – 40%.

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